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WHERE PHILOSOPHY MEETS MEDICINE: ACUPUNCTURE AND MODERN PHYSICS

Kamau Bandele Kokayi

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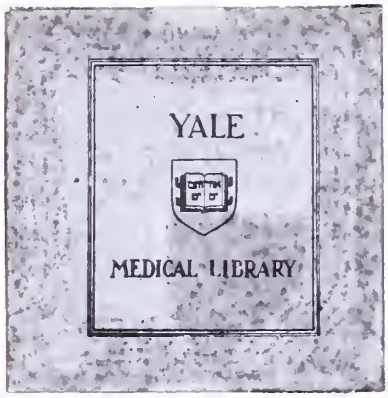
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Kamran Kalbarzi

Signature of Author

2/17/82

Date

WHERE PHILOSOPHY MEETS MEDICINE: ACUPUNCTURE AND MODERN PHYSICS

by

Kamau Kokayi

A Thesis
Submitted to the
Yale University School of Medicine
in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Medicine

1982

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To my parents

and the

rebirth of Heru

PREFACE

For the last one and one half years, my reply to the query of my fellow classmates as to the topic of my thesis, acupuncture and modern physics, has either left them visibly trying to suppress their amusement or elicited statements expressing their amazement that i would attempt such an enterprise. At the outset of this thesis, it became clear to me that in the minds of many of my colleagues and professors, i had stepped out of the bounds of science, at least as represented in current medical education. Yet for me, the writing of this thesis has been one of the more absorbing and fulfilling efforts of my student career. The fact that i am writing about a controversial area is not the key issue. The topic has provided me with a vehicle to express some ideas already shaped before i had heard of acupuncture per se. The present effort represents one of the few instances in my academic training where i have had the opportunity to creatively synthesize various fields of study and then apply them to an important area, in this case, health.

The thesis format has given me the opportunity to deal with questions not typically addressed in medical school, to go beyond the constraints of standard medical socialization, and to create a setting in which I can question some theories that i have learned in my medical education. While doing this

i have been struck by the significance of Thomas Kuhn's statement,

> Applications given in texts are not there as evidence but because learning them is part of learning the paradigm at the base of the current procedure.
>
> If applications were set forth as evidence, then the very failure of texts to suggest alternate interpretations or to discuss problems for which scientists have failed to produce paradigm solutions would convict their authors of extreme bias.

Accordingly, this thesis is not directed primarily at the facts generated by particular models but rather at the level of the theoretical suppositions, the paradigms themselves--where philosophy meets medicine.

I wish to acknowledge the inspiration and bits of insight passed down to me through the following: Ra Un-Nefer Amen, the Ausar Auset Society, Madinah Powell, William Wade, Ronald Davidson, Derek Davis, Ram Bhagat, Tony Finlayson, Gary Schwartz, Milford Graves, Mark Seems and David Butler.

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INTRODUCTION

A source of amazement to me throughout my medical education, especially my ward experience, is how little is actually known about health and disease. Despite all the important data generated by the traditional mechanistic approach to health, there is still a large grey zone which has been clouded by current medical terminology. The more obvious expressions of this are witnessed in such terms as placebo effect, spontaneous remission, idiopathic, cryptogenic, etc.

At a deeper level, the mechanistic approach to research asks us to believe that it is primarily through matter that the processes of life are correlated, regulated and integrated. Despite its shortcomings, this underlying approach to the comprehension of health and disease and the formulation of therapeutic modalities is often not taken seriously to task. The prevalent thinking is that areas of study lacking satisfactory explanations will be cleared up through the accumulation of more data in the already existing models. For example, it is generally believed that eventually researchers will develop the appropriate experimental models to isolate the chemical processes in question. Yet the insufficiency of this general approach was foreshadowed as early as 1947, by Dr. Henry Margenau, Eugene Higgins Professor of Physics and Natural

History at Yale. He wrote, "There is a vague though widespread feeling that particle techniques based on what is called mechanical reasoning cannot solve the ultimate riddle of biological organization." Unfortunately, the weight of such statements has been felt by relatively few and the implications investigated by fewer. Science typically selects problems that can be solved with conceptual and instrumental techniques already in existence.

The underlying premise of most of medical education and practice is that life is ultimately a chemical phenomena. Yet if one were to travel across Yale's campus and speak to a physicist one might hear something akin to the words of the physicist and mathematician Erwin Schrodinger,

> The arrangements of atoms in the most vital parts of an organism and the interplay of these arrangements differ in a fundamental way from all those arrangements of atoms which physicists and chemists have hitherto made the object of their experiments and theoretical research. . .
>
> Whether we find it astonishing or whether we find it plausible that a small but highly organized group of atoms be capable of acting in this manner, the situation is unprecedented. It is unknown anywhere else except in living things.

What Schrodinger describes has been referred to as life's unique ability to feed upon 'negative entropy.'

While i do not venture to put forth a vitalistic conception of life, i do think it well within the bounds of respectable scientific investigation to draw on other areas of scientific understanding which transcend chemical determinism, in an effort to come to grips with my own experiences which suggest, as Sir. J. Arthur Thompson puts it,

that, "Life is a unique activity, requiring concepts transcending those of mechanism."

Where does acupuncture fit in this? Acupuncture is a non-Western technology grounded in a science, which on the surface, appears to be no more than primitive philosophical conceptions. However, surface appearances can be misleading. For the purpose of this thesis, it will be shown that the science underpinning acupuncture attempts to handle the same set of facts and variables that Western medicine deals with, except that this information has been organized within a different set of references, thus taking on a new significance. This non-Western framework reflects a way of looking at the world which emphasizes patterns of relationships to be seen in all fields of knowledge. This non-Western inductive approach contrasts the Western analytical approach to knowing in which the specialist learns, so to speak, more and more about less and less.

It will further be demonstrated that acupuncture represents an important link between modern medicine and modern physics. Indeed, acupuncture can help crystallize the confrontation that is taking place between mechano-corpuscular physics and electromagnetic field theory.

My approach to this topic begins with a historical review of acupuncture in the West and then a representative sampling of the experimental work involving acupuncture. The latter will demonstrate that no one paradigm of physiological

interaction can sufficiently explain all the experimental findings involving acupuncture. In the remainder of the thesis, i will attempt to resolve this theoretical crisis in a manner which is compatible with well established scientific observations. It is only in the appendix that i give myself the liberty to reflect in a more speculative manner, on the implications of the divergent philosophical approaches of the West and many ancient non-Western cultures.

I. HISTORY OF ACUPUNCTURE IN THE WEST

> For the mind likes a strange idea as little as the body likes a strange protein, and resists it with similar energy. It would not be fanciful to say that a new idea is the most quickly acting antigen known to science. If we watch ourselves honestly, we shall often find that we have begun to argue against a new idea before it has been completely stated.
>
> Trotter

It has been nearly a decade since two events suddenly put acupuncture into the limelight in the Western world: in 1971, columnist James Reston's account of the successful treatment of his post surgical pain with acupuncture, in China, appeared on the cover of the N.Y. Times; less than a year later former President R. Nixon visited China and there was more reporting on this 'miraculous' healing art.

From the standpoint of acupuncture's introduction into the American health care system, its 'newness' has been both an asset and a liability. While the American public's imagination has been fired up, the American scientific community has been aloof, apathetic and more often than not, scornful. Part of this ill-feeling is a reaction to the faddist nature of the American public and the claims that acupuncture is a cure all. Part of it also reflects the difficulty that

American scientists have had in grasping the theory behind the practice of Chinese medicine and developing paradigms that would explain its effects.

Within the history of Western medicine, ideas running counter to the mainstream of medical thought, while having some clinical efficacy, have come under harsh criticism and censorship, because their 'scientific' basis was at question. Such was the case of the homeopathic school of medicine, which flourished during the late 1800's and early 1900's. It was practiced by respected physicians of the day and indeed St. Raphael's Hospital was, in part, a homeopathic hospital. It is only in recent years that scientific justification for its practice has begun to appear.

While the art of acupuncture is still plagued with misunderstanding, the key to the comprehension of its underlying mechanism has been uncovered and will be later discussed in this paper. Moreover, developments in the physical sciencies will aid in the unraveling of such non-Western conceptions as Ch'i, Yin and Yang, and the five elements.

Most people are unaware that throughout the history of Western medicine there has been repeated encounters with acupuncture. Perhaps its inexplicability prevented it from seriously being incorporated into Western therapeutics.

Looking back into the 4th century B.C. we see that Hippocrates describes in his sixth book the treatment of inflammatory conditions by the ear.[1] Similarly, ear

acupuncture is well described in the Hwang Ti Nei Ching Su Wen (The Yellow Emperor's Classic of Internal Medicine).[2] This ancient medical classic was published 2,500 years ago with parts of it thought to be over 4,000 years old. According to the French neurophysicist Paul Nogier, who developed a system of auriculotherapy using microcurrents, ear acupuncture treatment has been in the Middle East for more than 2,000 years.[3] Auricular cauterizations in the treatment of sciatica neuralgia were described by a Portuguese doctor, Zacutus Lusitanes in 1637 and by Professor Ignac Collain, 1810. Indeed, the esteemed D'Antonio Valsalva points out in a book, in 1717, that some areas of the external ear can be cauterized for the relief of cases of severe toothache.[4]

Acupuncture was also mentioned as early as the 1500's by a Portuguese, Fernando Mendez Pinto, following his travels to Japan. Ten Rhyne (1647-1690), physician of the Dutch East India Company who served in Japan, wrote perhaps the first illustrated book of acupuncture to appear in Europe. He discussed the various techniques of acupuncture and indicated that it was particularly useful in abdominal and head problems.[5] The distinguished German naturalist and traveler, Englebert Kaempfor, also a surgeon for the Dutch East India Company, discussed in detail methods of acupuncture and moxibustion (dry heat from the burning of Mugwort, Artemesia Vulgaris) in his book History of Japan (1716).[6]

The first European to practice this form of Chinese medicine was the Frenchman, Dr. Louis-Joseph Berlioz (1776-1848), father of the famous French composer, Hector. Berlioz found acupuncture useful in the treatment of pain due to neuralgia, lumbago and rheumatism, as well as diseases of the nervous system. In fact, in France, acupuncture enjoyed as great a vogue as auscultation during the early 1800's. The Academie des Sciences appointed a committee to study it, and clinicians such as Cloquet and Trousseau were among those interested.[8] Following this widespread interest was displayed in acupuncture and dozens of works on the subject appeared in Italy between 1825-1863. The authors included specialists and academicians such as Professor A. Riberi, head of the Turin Surgical clinic.[9]

In England, Croley was one of the first to describe his experiences with acupuncture in 1802. He was particularly interested in the treating of abdominal distention employing gold and silver needles.[10]

During the 1800's, there are a number of references to the beneficial use of acupuncture in the American medical literature. Bach was one of the first physicians in the U.S. to use acupuncture for the treatment of miscellaneous problems (North American Medical and Surgical Journal, 1826). It is a wonder that individuals tolerated the treatment as needles were left in situ for up to 24 hours.[11] Acupuncture was also advocated in the Southern Medical and Surgical

Journal of August 1836[12] and later by a report on acupuncture in the Journal of the American Medical Association in October, 1897.[13]

The famous physician, Sir William Osler, was quite familiar with acupuncture and in his classic textbook, The Principles and Practice of Medicine, 1892, he wrote,

> For lumbago acupuncture is in acute cases the most efficient treatment. Needles of from three to four inches in length (ordinary bonnet-needles, sterilized will do) are thrust into the lumbar muscles at the seat of pain and withdrawn after five or ten minutes. In many instances the relief is immediate, and I can corroborate fully the statements of Ringer who taught me this practice, as to its extraordinary and prompt efficacy in many instances.[14]

Moving back to France, we find a resurgence of acupuncture in the early 1900's as an outgrowth of the work of George Soulie de Morant, the French Consul in Shanghai, from 1907-1929. Morant was fascinated by Chinese medicine and brought a vast stock of Chinese medical books and was totally indulged in studying them as a non-physician. The result was the book L'Acupuncture Chinoise, published in 1939, and the creation of a new era in French Medicine. Acupuncture found widespread usage in major hospitals, physicians' offices, and in the formal teaching and research at medical schools. Now there are approximately 600 French doctors of medicine who practice acupuncture. Similarly trained professionals are to be found in Argentina, Austria, Belgium, Brazil, England, Germany, Italy, Switzerland and Russia.[15] Indeed,

the Soviet Union established an acupuncture research institute in 1951 and has been actively involved in investigating the mechanisms and applications of acupuncture ever since.[16]

Clearly, acupuncture has a significant history in the Western world. It has been around much longer than most of the therapies employed today in modern medicine. Nonetheless, acupuncture has never found a real niche in American medical therapeutics, despite its advocation by many famous physicians. Its present reintroduction differs from past encounters in that the mass media has taken it straight to the public. The latter has viewed demonstrations of acupuncture, including surgery with acupuncture as the only anesthetic, and more importantly, has made acupuncture a marketable commodity. Such broad exposure has not only piqued the interest of the scientific community but has posed a challenge to some very fundamental notions in allopathic medicine. I plan to address this at length but some preliminary work has to be presented first to dispel any ill-found notions concerning acupuncture's legitimate role as a viable therapeutic modality.

II. SCIENCE SAYS

Science says:

> Medicine's position today is akin to that of state religions yesterday--it has an officially approved monopoly on the right to define health and illness and to treat illness.
>
> Elliot Freidson

Since the early 1970's, literature dealing with acupuncture has increased exponentially. Several medical journals have also appeared in English, including the American Journal of Chinese Medicine, Acupuncture Research, and the American Journal of Acupuncture. Research into the mechanisms, effects and clinical applications of acupuncture has been undertaken in several American and Canadian medical institutions, not to mention an increased exchange of personnel and information between the People's Republic of China and the U.S. Despite this and in contrast to the greater than 30 years tradition of practice and research in Europe, the question that is still asked here in the U.S. is does acupuncture really work.

A brief review of some of the literature available in English will hopefully dispel any major doubts as to whether acupuncture works or not. Moreover, some of the material presented should raise some eyebrows, as the implications are quite profound. As we shall see, the real question is how does it work.

It is only within this decade that the American medical literature has begun to catch up to the Japanese and Europeans in terms of dealing with the mechanisms behind acupuncture. As with many other medical therapies, this has not stopped American doctors from utilizing acupuncture in such diverse clinical situations as inducing labor and the treatment of cancer. Indeed, this ad hoc practice has served as the groundwork for the formulation of many theories.

During the early 1970's, many researchers depicted acupuncture as a psychosomatic modality or hypnotic trick. Yet, French doctors, while at the Peking Municipal Veterinary Hospital, witnessed a horse undergo abdominal surgery with acupuncture as the only anesthesia. Immediately after the operation and suture, the horse was able to walk around without showing any signs of pain.[17] In fact, in the more than 400 operations on large animals at this hospital, there has been a 95% success rate for anesthesia.[18]

In the U.S., D. Les et al., while demonstrating the bankruptcy of the psychosomatic theory of acupuncture, also make it evident that acupuncture is more than a substitute anesthetic. In a series of experiments on dogs anesthesized with halothane, they were able to correct sinus arrhythmias by digital pressure and acupuncture to an acupuncture loci used for the treatment of cardiac arrhythmias (large Intestine 5, a limb point). Similar attempts at conversion using sham points were unsuccessful.[19]

In another experiment, the same group of researchers applied the dry heat from burning mugwort (moxibustion), to an acupuncture loci (governing vessel 26 located below the snout) in one group of dogs and to a sham loci in another group of dogs. Both groups were anesthesized with halothane. A significant increase in cardiac output and stroke volume and a significant decrease in the total peripheral resistance was observed on the group stimulated at the acupuncture loci. These effects continued to be present in dogs even when measurements were taken two hours after the moxibustion treatment.[20]

According to Kroger who strongly held the belief that acupuncture works through hypnosis, it (hypnosis) can only be utilized in about 10% of carefully selected patients. Yet, the Chinese show their acupuncture anesthesia success in thyroidectomy and 80% effective in surgery of the extremities.[21]

Another theory which enjoyed some attention during the early 1970's was the Gate Control theory of Melzak and Wall. It was proposed that impulses from incoming A-delta and C-fiber nerve afferents were modified by the cells of the substantia gelatinosa of the dorsal horn of the spinal cord. It was thought that acupuncture anesthesia resulted from the substantia gelatinosa cells being stimulated by the large A-fibers to block the impulses in the small C-fibers (generally associated with the mediation of pain sensation) from

ascending up the lateral spinothalamic tract into the central nervous system. However, the gate control theory cannot be a total explanation for the effects of acupuncture as it does not explain how stimulation of points on the extremities results in anesthesia of areas of the head. Additionally, the areas anesthetized may be on the opposite side of the head or body. I have personally seen this demonstration at a N.Y. State Acupuncture for Physicians and Dentists teaching conference. Wall, one of the co-authors of the original Gate Control theory, wrote in 1972, "My present guess is that . . . it will emerge that acupuncture doesn't generate the specifically pain inhibiting barrages for which I was looking."[22] Since then, multiple gate control theories have been posed by Chang,[23] and it has been postulated that acupuncture's effects are mediated by way of the thalamus.[24] However, as of yet, the hypothesized entity known as the gate has yet to be identified.

Further attempts to explain the analgesic effects of acupuncture have focused on the body's endogenous opiate substance, endorphins. It has been shown that morphine reduces the synaptic transmission between pain fibers entering the spinal cord and their target cells in the dorsal horn. Cells in the periaqueductal gray and nucleus raphe magnus, richly endowed with opiate receptors, detect the presence of morphine and transmit this message down the dorsal horn of the spinal cord. Here the terminals of the

descending fibers release serotonin, which through mechanisms yet to be discovered, interferes with the excitatory synaptic processes between the primary pain fibers and spinal neurons.[25]

In line with the above, scientists at the Peking Medical College were able to induce an increase in pain threshold in rats who received the cerebral spinal fluid of an acupunctured group of rats.[26] Furthermore, it has been shown repeatedly that the analgesic effect of acupuncture can be reversed by naloxone.[27] With this as a basis, Dr. H. L. Wen demonstrated that acupuncture is an effective modality in relieving the symptoms of withdrawal in drug addicted patients.[28,29]

Acupuncture stimulation of endogenous opiates has also been proposed as a mechanism to explain its clinical efficacy in the treatment of various chronic pain syndromes, despite the latter's differing underlying pathological processes, i.e. herniated disc, trigeminal neuralgia and bursitis.[30,31]

While the endogenous opiate theory has given scientists considerable mileage, there are still some pieces that do not fit. Why should pain relief from ear acupuncture be selective only for very specific parts of the body, i.e. according to the ancient prescriptions.[32] McLeuran et al showed that in electrical or chemical lesions of the raphe, serotonin output abolishes electro acupuncture analgesia in

rabbits.[33] Experiments by Chapman and Benedetti, Pomeranz and Cheng also indicate that the reversibility of acupuncture analgesia with naloxone was frequency dependent. No inhibition occurred at frequencies above 200hz. At higher frequencies, it was found that a serotonin synthesis inhibitor parachloraphenylalanine, partially blocked analgesia.[34] This may explain the fact that in one study on immunassayable B-Endorphin levels in the plasma and CSF of heroin addicts treated with electroacupuncture, there was no evidence of an increase in plasma or CSF B-endorphin levels. Yet the majority of addicts experienced a reduction of withdrawal symptoms during treatment.[35] Unfortunately, the researchers did not attempt to block the effect of the electroacupuncture with naloxone or a serotonin antagonist.

It should be kept in mind that endorphins are simply one class of brain chemicals with many others waiting to be discovered. Since 1977, "Valium receptors" have been reported and now the search is on for body chemicals that resemble valium structurally.[36] The key point is that the effect of acupuncture, whether brought on my manual vibration of the needles or electro acupuncture, may be mediated by an unknown number of body chemicals. To simply identify the chemicals involved does not get at the underlying mechanism by which acupuncture mediates its effects. What we are calling causes may actually be effects. The question that I

am hoping will come out of this is how can acupuncture be involved with so many different aspects of the body's functioning. What will become clear is that the complexity of the matter depends on the level of perception and interpretation of that which is being observed. For now we should just note that an essential factor in the endorphin experimentation was that the frequency of the electrical stimulation determined what chemicals were and were not involved.

Numerous researchers have noted that acupuncture to certain loci has a direct effect on the pituitary-adrenal axis. Using sensitive radio immunoassays, E. Malizia et al. have shown that there is a concomitant rise in the peripheral blood of levels of B-endorphin and ACTH with electroacupuncture on healthy adults.[37] In fact, the investigations of Boeva and colleagues revealed that stimulation acupuncture produced an effect similar to that seen following the injection of 25 I.U. of ACTH.[38] It should be noted that in the hands of a skilled acupuncturist, no pain or physical discomfort is experienced by the patient and that these responses are not produced at sham points.

Acupuncture can also be used to inhibit the hypersecretion of adrenal cortical hormones. This was demonstrated by Dr. Ying Yi Liao et al with rabbits placed in situations inducing stress (immobilizations, exposure to cold and heat).

Again there was no significant effect when sham points were utilized.[39]

Also of note is the extensive use of acupuncture as an aid in inducing labor. This grew out of the concept, based on traditional Chinese teachings, that certain acupuncture loci should be avoided in pregnancy as stimulation of these may cause abortion or premature labor. In fact, acupuncture has been used as an abortifacient through the induction of uterine contractions. The main set of loci used are on the extremities. In one study with 60 primigravidae, the subjective length of labor and the objective active phase of labor were significantly reduced as compared to a non-acupunctured control group.[40]

Group with Acupuncture	Subjective length of labor	Active phase of labor
#60	6.5 ± .03 p1 0.02	4.85 ± 0.3 p1 0.1
Group without #60	8.1 ± 0.5	5.8 ± 0.39

Avg. length of labor in hours
± Standard deviation

Another theory for acupuncture's effects has focused on one of the essential regulatory systems in the human body, the autonomic nervous system. Many have felt that the wide ranging physiologic changes that may take place in the body as a result of the interaction of the sympathetic and parasympathetic nervous system could explain the diverse effects of acupuncture needling:

> It appears that the impulses stimulated by various needle points on the skin are transmitted to the internal viscera through the somatovisceral neuronal synapses, in the spinal cord. During the process of transmission through such synapses, one of the components of the visceral nerves--either the sympathetic or the parasympathetic--seems to be selectively stimulated and adjusts the function of the autonomic nervous system.[41]

Lee et al. at the Medical College of Ohio working with dogs anesthetized with halothane, were able to block the increase in cardiac output and decrease in total peripheral resistance following acupuncture and moxibustion to the point Jen Chung (60-26), with phentolamine, an alpha-adrenergic blocking agent. The same occurred with the use of propanolol, a Beta-adrenergic blocking agent.[42] Conversely, with acupuncture to the point Tsu Zanli (st-36), located one finger breadth lateral to the anterior crest of the tibia, cardiac output was decreased, an effect blocked by atropine. In both sets of experiements, the effect of anesthesia alone was unremarkable.[43]

Experimentation in rats has shown that the acupuncture locus Fung Lung (Stomach 40 anterior aspect of the leg) causes a significant decrease in total perpereal resistance without causing an increase in cardiac output.[44] In fact, there are no less than 11 points which are said to be effective in the treatment of hypertension in humans.[45] Thus far, i have only seen anecdotal case reports to support the use of acupuncture in the treatment of essential hypertension.

In line with the above research has been my own experience with asthmatic patients treated with acupuncture. While working at a clinic in New York which combined Chinese and Western medicine, i participated in the treatment of a ten-year-old Haitian girl who developed a non-allergic asthma three months prior. Her attacks were precipitated by upper respiratory tract infections, emotional upset and exhaustion. During the month preceding her visit, she had been to the emergency room no less than six times and had been hospitalized for three days following her severest attack. Two days prior to her first visit, she had been to the emergency room and was discharged on Actifed.

At her first visit, she was disconsolate but her lungs were clear and her cardiac exam was within normal limits. Aside from her acupuncture treatment, she received several 12" sticks of moxibustion to be used as a dry heat if she experienced any difficulty breathing. This proved to be very useful during the first week, as the mother informed us that had it not been for the heat of the moxa, she would have had to take her daughter to the emergency room. What really struck me was that the points that the mother was told to heat on the back correspond to the area over the sympathetic chain within the dermatones of the lung. It is not hard to conceive of the heat as a stimulant to the release of noradrenalin thereby facilitating bronchodilitation. As i have not laid the groundwork for the discussion of the way this

patient was treated overall, i will just add here that after seven visits she required no more treatments and was asthma free after two months of follow-up. Of note is that there is documentation which demonstrates that acupuncture may effect blood levels of epinephrine, norepinephrine, diamine oxidase, acetylcholine, acetyl-choline esterase and histamine.[46]

In patients with peptic ulcer, acupuncture has been shown to decrease the mean basal acid output and the mean maximal acid output following pentagastrin stimulation.[47]

The New York State Commission on Acupuncture also cites the ANS as being the structure through which acupuncture mediates its effects.[48] Finally, Dr. Gerald Li Looney of the University of Southern California School of Medicine at Los Angeles, writes:

> If these reports can be confirmed and the autonomic theory of acupuncture validated then the astounding implications of acupuncture, from the patient's point of view, may very well be surpassed by the physician's point of view. An entirely new look will have to be taken at human physiology in general and the nervous system in particular. The simple comfortable concepts from the past may have to be redefined as we find the CNS/ANS axis actually seems more comprehensible when viewed as a highly integrated and unified system, and that this unitary nervous system, in turn is involved intimately in the dysfunction and pathology of all other body systems.[49]

This statement is intuitively appealing yet it goes against the grain of the established order. Yet, how can we

explain the diversity of acupuncture's effects. And still we have only skimmed the surface. There are even studies at the Rush Pain Center in Chicago, Illinois, demonstrating acupuncture's beneficial effect in a significant percentage of patients suffering from multiple sclerosis, parkinsonism, peripheral vascular disease, and stroke.[50] For me to continue on in this manner would only add to the confusion and make it appear that i am presenting acupuncture as panacea.

As i pointed out in the beginning of this paper, key to the acceptance of acupuncture is the delineation of its modus operandi. Without this, it will remain a quasi-medical field and skepticism will abound. While the information i have presented thus far does not conclusively answer the question, 'how does it work,' it strongly suggests that it apparently does work and that it might prove to be a formidable tool in the medical repetoire of therapeutic modalities.

Other obstacles to its acceptance include:

1. Commercial exploitation and charlatanism which gives acupuncture a non-professional aura;
2. Difficulties in conducting properly controlled double blind clinical research;
3. The fact that different acupuncturists may use different groupings of loci in order to obtain the same results;
4. Confusion caused by several classification systems for loci;

5. The extravagant claims in Eastern literature.

Clearly, culture shock and the commercialism of the American economy have taken their toll on acupuncture. American physicians are as little prepared to deal with concepts such as Yin and Yang as the pharmaceutical industry is prepared to deal with a non-pharmaceutical medical therapy. However, despite these obstacles and what science says, acupuncture with over 2,000 American physicians practicing it, will continue to grow.[51]

III. ROOTS OF MISUNDERSTANDING

> One of the greatest qualifier's of a man's life is his conception, perception and/or interpretation of reality.
>
> R. A. Straughn

Through my daily exposure to the practice of acupuncture during 1980, it became clear to me that patients were receiving considerable benefits from their treatments. I felt compelled to get to the essence of acupuncture. My biggest obstacle was that i could not reconcile what appeared to be metaphysical foundation of acupuncture with modern medicine. Something had to be amiss. From the scientific standpoint, the human being can only reflect one reality. All medical technologies must therefore flow from the same scientific foundation. I realized that the confusion in the understanding of acupuncture was much deeper than acupuncture itself. The latter is only the by-product of an ancient conception of the Universe that has its roots in the metaphysical as opposed to modern medicine which has its roots in the physical world of pre-twentieth century classical physics.

In my efforts to get to the root of the divergent approaches of Western and Eastern medicine, i had to study the philosophical underpinnings of both disciplines using the physical sciences as a back drop. Indeed, the development

of nuclear physics and electromagnetic field theory have proven key in the Western world's attempt to not only understand acupuncture but to comprehend much of the so-called magico-religious thinking of 'primitive man.'

Let us begin by examining the Western allopathic medical tradition.

It would be incorrect for us to return to the Greeks of the ilk of Plato, Eudoxius or Aristotle. For, unlike the medicine of today, they emphasized the oneness of nature--continuity, unity and its field character. Rather, we return to the point at which modern medicine begins to develop in leaps and bounds--the 17th century. Here the development of Newtonian classical physics provided the model which would be used to describe the universe, and indeed, life itself.

The stage of the Newtonian Universe, on which all physical phenomena took place, was the three dimensional space of classical Euclidean geometry. It was an absolute space, always at rest and unchangeable. In Newton's own words, "Absolute space, in its own nature, without regard to anything external, remains always similar and immovable."[52] All changes in the physical world were described in terms of a separate dimension, called time, which again was absolute, having no connection with the material world and flowing smoothly from past, through the present, to the future. "Absolute, true and mathematical time," said Newton, " of itself and by its own nature flows uniformly without regard to anything external."[53]

Newton's laws were based on observations of the everyday world. These observations were concerned with the functional properties of the elements which moved in this absolute space and absolute time. As Newton clearly made a distinction between space-time and the particles which moved within it, his laws explained the motion of these particles in space and time. Within this cosmology, matter could not be destroyed and was thus always conserved. As for elementary matter, this was created by God and not subject to further analysis. In his work Opticks, Newton gives us a clear picture of how he imagined God's creation of the material world:

> It seems probable to me that God in the beginning formed matter in solid, massy, hard, impenetrable, movable particles, of such sizes, and figures and with such properties, and in such proportion to space, as most conduced to the end for which he formed them, and that these primitive particles being solids, are incomparably harder than any porous bodies compounded of them; even so very hard, as never to wear or break in pieces; no ordinary power being able to divide what God himself made one in the first creation.[54]

While one could say that this statement does not reflect the truth of the matter (pun), this level of comprehension was in keeping with the philosophical notions of the day. For example, Descartes, prior to Newton's work, introduced the fundamental division of the I and the World. In this conception, it was believed that the human observer could objectively describe any process going on in the world and that

such an objective description was indeed an ideal. The Universe was seen as essentially a Great Machine.

Men such as Galileo and Newton laid the scientific foundation for this particular conception, perception, and interpretation of reality. By the time Laplace had succeeded in explaining the motion of the planets, moons, and comets, in the 1700's, the story goes that Napoleon, to whom he had presented his first work remarked, "Monsieur Laplace, they tell me you have written this large book on the system of the universe and have never ever mentioned its Creator." To this Laplace replied bluntly, "I had no need for that hypothesis."[55]

Within this framework, modern science sought to discover the workings of the Great Machine. This mode of investigation enabled Western man to analytically dissect such concepts as heat, the motion of fluids, and the vibration of elastic bodies. Moreover, Newtonian physics laid the foundation for the present approach to health and disease. The physics of the Great Machine was applied to the physics of the human body. H. S. Burr writes,

> Galileo had no sooner developed his physical and mechanical theory of the inorganic universe than Harvey proceeded to apply physical and mechanical conceptions to living creatures in the discovery of the circulation of the blood. Levoisier revealed the chemical character of respiration in metabolism in living things at the same time that he placed chemistry upon a secure foundation with the discovery of the principle of conservation of

> of mass. Gradually with Liebig and a vast army of physiological chemists, the chemical nature of living creatures become more and more evident.[56]

As we shall see, this does not necessarily mean that this was and is the only way to comprehend life or indeed that the conclusions drawn actually reflect the truth of the matter. Logical conclusions have nothing to say about the truth of the initial observation. Nevertheless, information was derived which proved useful in Western man's efforts to comprehend the body's internal functioning. Observations could be rendered meaningful in a systematic way. Indeed, this particular conception, perception and interpretation of reality opened the door for much of today's technology and the power wielded by the Western world.

With the coming of the 20th Century, the discoveries of modern physics necessitated profound changes in concepts such as space, time, matter, objectivity, cause and effect, etc. Out of these changes emerged a new and radically different world view, still in the process of formation. Niels Bohr wrote:

> The great extension of our experience in recent years has brought to light the insufficiency of our simple mechanical conceptions and as a consequence, has shaken the foundation on which customary interpretations of observation are based.[57]

With the discovery and investigation of magnetic phenomena in the late 19th Century, Western scientists had to go beyond the Newtonian laws of motion and replace them

with fields of force. While many experimenters tried to hold onto the old mechanistic interpretations, Albert Einstein would not let them. In 1905, he published his Special Theory of Relativity.

In relativity theory, the notion of the absoluteness of space and time was discarded. Einstein proved that both were intimately connected, forming a four dimensional continuum space-time. Within this framework, space and time could not be separated. On one level, this is similar to our designation of time by the position of the hands on a clock.

Einstein's new conception of space and time forced a reappraisal of some very fundamental Western concepts concerning the nature of the Universe. Through Einstein came the comprehension in the West, that matter is nothing but a form of energy--$E = MC^2$. He wrote:

> We may therefore regard matter as being instituted by the regions of space in which the field is extremely intense. . . There is no place in this new kind of physics both for the field and matter for the field is the only reality.[58]

Also occurring during the early 20th Century, though inexplicable within the realm of classical physics, was the realization that the atom was not one solid particle. This subatomic reality required the development of quantum mechanics to describe the movement and interaction of extremely small particles in the vast regions of space

which composed the atom. Quantum mechanics pictured this interaction as the exchange of packets of energy--quanta. However, the distinction between the particles and the packets of energy became blurred. It was no longer possible to measure both the position of a particle and its momentum at the same time. It was shown that matter does not exist with certainty at definite places but rather shows tendencies to exist. Because physicists needed to remain anchored in the concrete sense realities of everyday life all the laws of atomic theory were expressed as probabilities of interconnections.

Philosophically, these findings have profound implications:

> Not only do we influence our reality but in some degree, we actually create it. Because it is the nature of things that we can know either the momentum of a particle or its position, but not both. We must choose which of these properties we want to determine. Metaphysically this is very close to saying that we create certain properties because we choose to measure these properties. Said another way, it is possible that we create something that has position for example like a particle, because we are intent on determining position and it is impossible to determine position without having something occupying the position that we want to determine.[59]

In other words, the way we approach a situation predetermines what we possibly will and will not find. In telling us that we somehow create what it is we want to measure,

quantum mechanics is saying that it is no longer possible to observe reality without changing it. To think that one can be an objective observer, describing an absolute truth in the world, becomes an unscientific notion, a point of view. Quantum mechanics pushes us from the realm of observation to that of participation. And as a participator, human consciousness becomes an important aspect of describing the world.

While one might remark that these conclusions can only be made with regard to microscopic phenomena we will shortly see that this reality also holds for the macroscopic world.

In the autumn of 1927, physicists working with the new physics met in Brussels, Belgium, to essentially deal with the question, 'What is it that quantum mechanics describes?' While they were unable to answer this question, there was general agreement on the universal interconnectedness of things and events. David Bohm, professor of physics at the University of London, wrote:

> One is led to a new notion of unbroken wholeness which denies the classical idea of analyzibility of the world into separately and independently existing parts . . . We have reversed the usual classical notion that the independent 'elementary parts' of the world are the fundamental reality and that the various systems are merely particular contigent forms and arrangements of these parts. Rather, we say that relatively independently behaving parts are merely particular and contingent forms within this whole.[60]

The interpretation that came out of this conference was known as the Copenhagen Interpretation of Quantum Mechanics. It said in effect that it does not matter what quantum mechanics describes. The important thing is that it works in all possible experimental situations. This is very similar to the stance Newton had taken some two hundred and fifty years earlier with regard to the nature of the elements that he was dealing with. He knew that the laws of motion were applicable to physical bodies and left the atomic world to the secretion dominion of God.

In contrast to Newton's period, there were many 20th Century scientists who continued to probe and hypothesize as to what it was that quantum mechanics described. In 1935, Einstein, Podolsky and Rosen published a thought experiment which transcended even what quantum mechanics could adequately describe. They showed that an area, S1, could simultaneously react, that is react greater than the speed of light, to an event occurring in a spatially separated area, S2. This defied one of the basic assumptions of physics, that nothing can travel faster than the speed of light. Einstein closed his argument with the following aside:

> One can escape from the conclusion (that quantum theory is incomplete) only by either assuming that the measurement of S1 (telepathically) changes the real

> situation of S2 or by denying independent real situations as such to things which are spatially separated from each other. Both alternatives appear to me entirely unacceptable.[61]

This experiment laid the basis for, "the most profound discovery of science."[62] In 1964, a physicist, J. S. Bell, published a theorem (verified by the Clauser Freedman experiment in 1972) which proved that the interconnectedness of the subatomic world is also the reality of the macroscopic world.

Bell's theorem disproved the Theory of Locality of Causes which said that what happens in one area (macroscopic level) does not depend upon variables subject to the control of an experimenter in a distant space-like separated area. Scientists were now forced to consider what Einstein had considered unacceptable, 'superluminal information transfer' (telepathy).[63]

Bell's theorem proved that there could be no such thing as chance and that all things and events depend on what is happening elsewhere. This was clearly a step beyond the pragmatism of quantum mechanics in which the occurrence of individual events were seen as pure chance. While predicting the probability of potentialities, it could not predict which interaction would result in which potentiality. Henry Stapp, a physicist at the Lawrence Berkely Laboratory, writes:

> . . . the conversion of potentialities into actualities cannot proceed on the basis of locally available information. If one accepts the usual ideas about how information propagates through space and time, the Bell's theorem shows that the macroscopic responses cannot be independent of far away causes. This problem is neither resolved nor alleviated by saying that the response is determined by 'pure chance,' at least to the extent of allowing some sort of dependence of this response upon the far away cause.[64]

We might question Stapp's use of the word cause as the interconnectedness being described here transcends cause and effect. The astronomer Fred Hoyle is more to the point when he writes:

> Present day developments in cosmology are coming to suggest rather insistently that everyday conditions could not persist but for the distant parts of the Universe were taken away. Our everyday experience even down to the smallest detail seems to be so closely integrated to the grandscale features of the Universe that it is well nigh impossible to contemplate the two being separated.[65]

While science is pointing to the oneness of life, of the Universe, the philosophical, cultural, and spiritual implications of this world view are only very slowly coming to light. The mechanistic fragmented view of the world still prevails within all areas of Western life, including health and medicine. Within the latter, the cause of events is looked for in the molecular realm, in a manner prescribed by models of reality which at best only deals with our abstractions of reality.

Under the influence of fast growing technology, everything in medicine is thought to be measurable, i.e. isolatable and subject to being manipulated, constructed or visualized. However, the multitude of interrelating internal and external factors which make our living existence possible present a hopeless tangle for the relatively crude and rigid investigational methods which have come to dominate medical science in the last decades. From the point of view of 20th Century physics, the functional and metabolic definitions of disease given by present day medicine do not adequately describe reality and therefore may serve as misleading guidelines for the development of new therapeutic concepts. The problem is in the approach as opposed to a lack of data. A closer look at gains made reveal that for the most part they concern either technical manipulations and related fields or attacks on diseases which arise by intervention of foreign organisms from the environment as, for instance, bacterial or many viral infections. In success and failure, the underlying approach has been to treat the physical manifestation of disease by either direct intervention or manipulation of factors shown to have a role in the pathophysiology of the disorder. In many instances, treatment focused at this level can only mask symptoms at best (anti-inflammatory agents and steroids). The reality that matter is but a form of energy does not translate into conceptual approaches to health and disease. Meaningful discussion does not go beyond the realm of physiology and pathology.

Areas of study such as psychology and psychiatry either resort to a chemical substance to describe the interrelationship between mind and body or are unable to fit their results into a paradigm that has an 'acceptable scientific' basis. Phenomena such as the placebo effect, which suggest that one's molecular functioning may be altered through mere suggestion, cannot really be investigated because there is no place for such conceptualizations within the mainstream conception, perception, and interpretation of reality. Yet modern physics suggests that there can be no such thing as chance. Perhaps things and event/phenomena which we call chance or that do not fit into our system of thinking reflect the inadequacy or incompleteness of our present models to grasp the whole/true picture.

By 1975, the physicists who had been watching the unfoldment of quantum theory, the Einstein, Podolsky and Rosen thought experiment, and Bell's theorem were led to consider the possibility of a fundamental unity lying deeper than quantum theory and relativity theory--a fundamental unity which somehow allowed faster than light connections between apparently separate parts of physical reality. This is to say that the fundamental process of Nature lies outside of a space-time domain but generates events that can be located in space-time. Matter in this context becomes, ". . . merely a disturbance of the perfect state of the field at that place, something accidental, one could almost say merely a 'blemish.'"[66]

While Bell's theorem allowed scientists to more closely approximate reality in their thinking, they, like the proponents of the Copenhagen Interpretation of Quantum Physics, had to admit that it might not be possible to construct a model of reality. "This was more than the recognition of the limitation of this theory or that theory. It is a recognition throughout the West that knowledge itself is limited."[67] Max Plank, the father of quantum mechanics, had intuited this earlier: "Science . . means unresting endeavor and continually progressing development toward an aim which the poetic intuition may apprehend, but which the intellect can never fully grasp."[68] At the basis of these realizations rests the understanding that the physical world is determined ultimately by our conception, perception, and interpretation of reality.

What is interesting to note is the similarity between the reality of modern physicists and the wisdom systems of non-Western people. Let the following statements serve as examples:

> The great scientific contribution in theoretical physics that has come from Japan since the last war may be an indication of certain relationship between philosophical ideas in the tradition of the far east and the philosophical substance of quantum theory.[67]
>
> Werner Heisenberg

> The Buddhist does not believe in an independent or separately existing external world into whose dynamic forces he could insert himself. The external world and his inner world are for him only two sides of the same fabric, in which the threads of

> all forces, and all events, of all forms of consciousness, and of their objects, are woven into an inseparable net of endless, mutually conditioned relations.[70]
>
> Tantric Buddhist,
> Lama Anagrika Govinda

> . . . the root of all things is subtle, while the material things are gross (appearance of reality): all measurable quantities fall short of the truth of reality. . . not being is the constant phase (of life) and all things can be traced to the Great One.[71]
>
> Taoist Philosophy

> Time, space and causation are like the glass through which the Absolute is seen . . . In there is neither time, space, nor causation.[72]
>
> Swami Vivekananda

In the philosophical construct which is universal to indigenous African people, there are four categories of reality. The Bantu-speaking people call them:

Muntu - the foreless imperceptible reality

Kintu - energy matter (things and forces), this includes the emotions

Hantu - the space-time continuum in which all things must be placed

Kuntu - the Relative world acting within the Absolute; the modalities through which these interact

The determinative stem NTU is the same for all these categories. It is the universal force which never occurs apart from its four manifestations. NTU is that force in

which being and non-being coalesce. It implies that energy, matter and the unknowable have never been separate.[73]

It is important for us to realize that modern physics understanding of reality is approximated by peoples whose culture bears very little resemblance to the Western way of life. Nor have they studied quantum mechanics, Bell's theorem, or even been educated in the Western sense.

One way to view this curiosity is in terms of the split brain analysis. In the treatment of epileptic patients, it was discovered that the left and right hemisphere characteristically differ in the manner in which they perceive and interact with the world.

In right-handed persons, the left side of our brain tends to interpret the world in an analytical, linear manner. It experiences things in a temporal fashion, expressing more of a strict, literal mode of interpretation and expression. That is, it functions logically and rationally. It is this side of the brain which probably creates the concept of causality, because it pictures things or events as one preceding the other. This is the required mode of thinking for present day technology.

The right side of the brain tends to interpret the world in whole patterns. It is the 'artistic' side of the brain. Thoughts are represented through symbolical imagery. As it views things through spatial and phonetic symbols, it is probably the basis for synthetic and inductive thinking. On one

level, in comparison with the left hemisphere, one can say that it is the irrational mode of cognition.

Without exaggeration, it can be stated that Western society reflects a left-sided dominance. Among other things, it is very rational and 'objective.' It is a very difficult medium for the cultivation of higher modes of right hemisphere cognition. Indeed, cultivation of the latter results in what Asian and African cultures call wisdom.

> The advent of science marks the beginning of the ascent of the left hemisphere thinking into the dominant mode of Western cognition and the descent of the right hemisphere thinking into the underground status. . .[74]

The recognition that 'knowledge' itself is limited with regard to constructing a model of Reality acknowledged that a complete comprehension of reality lies beyond the capacity of rational thought. Indeed, it was a recognition of the limitations of left hemispheric thought. Professor Bohm has even suggested that, "We must turn physics around. Instead of starting with parts and showing how they work together (the Cartesian order) we start with the whole."[75]

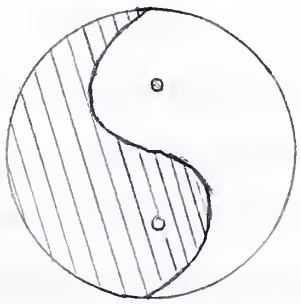
If scientists follow this suggestion, i hope that they would at least give some consideration to the philosophical constructs that have already existed for thousands of years. Not only should they evaluate these constructs but also the manner in which they give rise to social institutions including medicine. It is here that philosophy meets medicine.

IV. WHERE PHILOSOPHY MEETS MEDICINE

> One need only study Eastern philosophy and Maxwell's equations to appreciate that man may have described electromagnetism no less than electromagnetism described man.
>
> Stuart Hameroff

The Chinese speak of a primordial root no-thingness, a formless chaotic reality, from which arises a dual power held to be instigator of all change. Change was viewed as the expression of duality, as an emergence of a second out of a first state. The two components of this dual power were called Yin and Yang. Within this classification system, Yin and Yang were said to be complementary forces shaping the structure of all things and ordering the unfoldment of all events.

The mandala or archetypal image associated with this concept is called T'ai-chi T'u or Diagram of the Supreme Ultimate, drawn here.



The universality and the pairing of Yin and Yang are thus created and imposed on reality at all levels. Yin and Yang are just polar specks of the one root primordial being.

On the subatomic level, this is reflected in the electromagnetic force that holds the atomic nuclei together (physicists call it the strong force--Yin structive, providing stability, counteracting the repulsive force-Yang of tightly packed protons and neutrons). Physicists have called this the fundamental glue of the Universe. This attraction and repulsion of charged particles (or rhythmic alteration of the two fundamental forces) also occurs on the atomic and molecular levels and indeed is universally responsible for structures and events manifesting on these levels.

What we should keep in mind here is that 20th Century nuclear physics states that the underlying reality is to be found in the field force or flux of what the Chinese call Ch'i. Matter is just a condensation of the field at a particular point in a space-time continuum that reflects the vibratory motion of its fundamental polar qualities. Our solid reality is in actuality, "a rapidly pulsating matrix of fields of energy, an interference pattern of waves filling the vast vacuum of our bodies (between nuclei and electrons), and continuing beyond them in a more diluted fashion."[76] Within tissues and organs, the vibratory flux is still present but the field character, or quality of the Yin-Yang interaction is denser, such that we experience it through our five

senses as physical matter. Needham writes,

> The Chinese physical universe in ancient and medieval times was a perfectly continuous whole. Ch'i (vital energy) condensed into palpable matter was not particulate in any important sense, but individual objects acted and reacted with all other objects in the world. . . in a wavelike and vibratory manner dependent in the last resort, on the rhythmic alternation at all levels of two fundamental forces, the Yin and Yang. Individual objects thus had their intrinsic rhythms. And these were integrated into the general pattern of the harmoney of the world.[77]

If the field constitutes the underlying reality, then it should be discernible at all levels. Indeed, it has only been within recent history that modern science has begun to understand the Earth's electromagnetic field and its relationship to life.

It is well documented now that the entire electromagnetic field of the Earth fluctuates with the circadean, lunar, and yearly periods, with longer periodicities (11 years) imposed by the solar cycle. In fact, within the biosphere, there exists the cyclic fluctuation of all frequencies of the electromagnetic spectra, from the Earth's field to that of gamma rays. Thus, we see that even such a body as the Earth reflects the rhythmic interaction of Yin and Yang and may be affected by the fields of other bodies, i.e. sun, moon.

That electromagnetic fields permeate various levels of biological organization is clear now.

> We know that the biological cycles of sleep-wakefulness, evident in all living things, are the result of the same cycle of rhythmic fluctuations in the earth's EM field. The migration of many animals is guided by the earth's EM field; in fact the navigational ability of the homing pigeon is based upon a magnetic compass far more sensitive than the best instrument we can manufacture. In the geologic past, the magnetic field reversed itself on many occasions; these were associated with 'great dyings' during which entire species of animal were eliminated. . .[78]

Back in the 1940's, Dr. Saxton Burr, a Yale anatomist, performed an experiment here in New Haven, in which he recorded changing electrical properties in a maple tree, an elm tree, the earth, and the atmosphere. He writes,

> From the beginning an extraordinary correspondence in the four records appeared. The two trees, the air and the earth exhibited variations at approximately the same time. The magnitude differed but all four showed increases in the positivity of the 'hot' electrode at the same time.[79]

In the book Electromagnetic Fields and Life, A. S. Pressman gives evidence to support the idea that

1. Nature uses EM fields as information carriers between the environment and organisms
2. Electromagnetic processes are involved in informational interconnections within living organisms
3. Electromagnetic fields facilitate informational interchange among living organisms.[80]

Pressman documents the manner in which EM fields may disturb the neurohumoral regulation in an organism and the

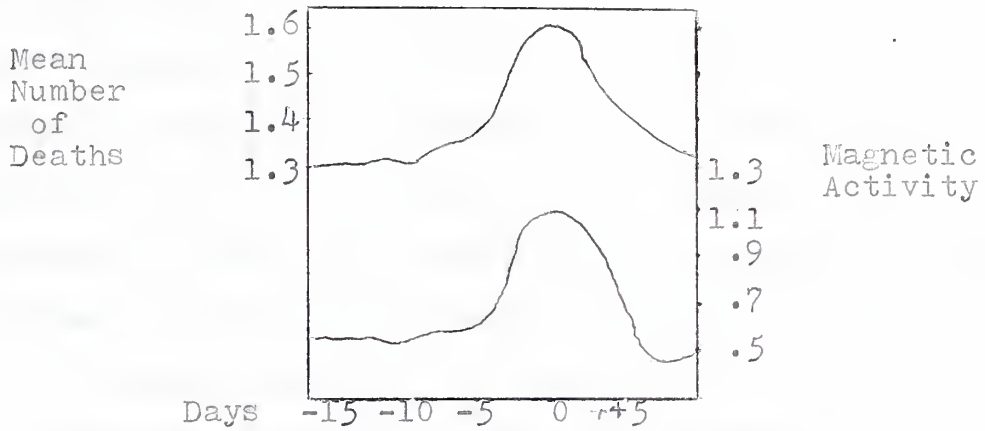
consequent alteration of the functions of the endocrine system, cell metabolism, and enzymatic processes.[81] He indicates that artificial EM fields have been used to affect the embroyonic growth and development of plants and animals.[82] Because the field penetrates the animals entire body, it can directly affect macromolecular processes in the body. Furthermore, EM fields have a direct effect on germ cells and may be responsible for the physicochemical intracellular regulation processes and the destruction of intracellular structures.[83] Indeed, the lining up of the intracellular fibrils during mitotic events is reminiscent of the way iron filings line up when placed in a magnetic field!

With regard to human health, the role of EM fields is only slowly coming to light. Piccardi points out (1965) "Since the time of Hippocrates no one has considered the effect of cosmic factors on biological processes. Only obvious meteorological variables have been considered."[84]

Pressman writes,

> A relationship between the daily changes in diastolic pressure and total leucocyte count in the human blood and daily changes in the earth's electromagnetic field intensity was reported as long ago as 1935 (Alverez). At about the same time Dulls (1936) examined a large body of statistics (40,000 cases) and found a correlation between 67 magnetic storms over a period of 60 months and an increase in the incidence of nervous and psychic diseases. A correlation of the same kind was established later in the period from July, 1957, through May 1961, from an analysis of more than 28,000 cases of psychic diseases for 7-14-21-35, day periodicities corresponding to magnetic storms.[85]

In the figure below, the correlation between the mean of 60 periods of magnetic storms and 4,899 deaths from cardiovascular disease in Copenhagen and Frankfurt is demonstrated.[86]



Not only does man reflect the fluctuation of the natural electromagnetic environment, but it is now being realized that the EM fields generated from electrical power and communication process may have biological effects.

> Magnetic fields as low as one gauss in intensity, fluctuating at frequencies close to that of our power lines, can produce changes in human reaction times and other measurements of overall neural functioning as well as major alterations in blood lipids, which can be associated with arteriosclerotic disease. Electrical Fields of a few thousand volts in strength, fluctuating at a power frequency of 60 cycles, are known to produce marked stress responses in animal populations chronically exposed to them.[87]

Of note is that when electrical power was instituted earlier this century, there was an uproar from what we would call the environmentalists, concerning the safety of such measures.

Weak electromagnetic fields have also been shown to affect the behavior of both humans and animals and more importantly, these changes can be correlated to altered neurophysiological activity and modified brain chemistry.[88] What has been concluded is that the mammalian central nervous system function can be modified by electrical gradients in cerebral tissue that are substantially smaller than those known to occur in postsynaptic excitation, as well as those presumed to occur with inward membrane currents as synaptic terminals during the release of transmitter substances.[89]

A direct extension of the above has been made to the explanation of so-called psychic phenomena. Since all matter, animate and inanimate, is ultimately an electromagnetic phenomena then one can postulate that certain individuals have an enhanced capacity to detect EM fields generated by other life forms. Dr. R. O Becker, of Upstate Medical Center, writes,

> . . . is it not practical to predict that certain individuals have enhanced capacities to control and enhance their own EM fields? Since we do know that the cellular function of our bodies are controlled by our own internal DC field, can it not be that the 'healer' can generate 'supportive' electric currents and voltages which he or she conveys to the patient to bring about resolution of the pathological state?[90]

In fact, in 1969 Teilhard de Chardin postulated that, in addition to the biosphere, there is a noosphere, a world field of thoughts and the perceptions of all living things.[91] This

conception is similar to that of many ancient cosmological systems to be discussed in the appendix. Perhaps working out of a framework that is grounded in field theory we can begin to comfortably discuss such understandably controversial matters.

Of note is that EM fields have been shown to alter sense perception of the kind we are more accustomed to thinking about:

1. D'Arsonaval (1893) discovered the phenomenon of phosphene (sensation of light flashes in the eye) due to the action of an EM field.
2. Jaski (1960) reported that people exposed to an EM field in the frequency range 380-500MHz are subject to visual hallucinations.
3. People exposed to a pulse modulated EM field hear various sounds (buzzing, knocking, or whistling), depending on the modulation. The sound source seems to be somewhere in the region of the occiput. Experiments involving screening of the head showed that 'radiosound' could only be perceived in the temporal region.
4. Noval (1963) reports a tactile sensation in man due to a pulsed electric field. The subject, situated inside a solenoid, experienced jolts--on both sides of the spine in the femoral region when lying on his back, in the epigastric region when lying on his side, and in the stomach region when lying on his stomach.

5. Frey (1963) also described tactile sensations--itchiness or soreness on the skin of the face or forearm--in people situated close to the antenna of an ultra long wave (14.7 Khz) radio station.[92]

In summary, what i am trying to demonstrate here is that matter and energy are different degrees of the same thing. Their underlying reality is rooted in the cyclic interaction of Yin and Yang which occurs at all levels of manifested reality. It is from the standpoint of the field that the Chinese have developed their conceptions of health and disease. This interpretation of reality approaches Einstein's conclusion that matter results from regions of space where the field is extremely intense. Moreover, we will shortly see that the acupuncture meridians and loci are very much tied up with electromagnetic phenomena. Before moving on to this, let me further synthesize what the 'new physics' is begging us to behold.

1) The human being is a part of a living universe which is tied together in a web of electromagnetic energy interrelating all things. That is, the field characteristics of a living system is a basic property of manifested reality and is part of the overall or general pattern which represents the Universe.

2) In the same way that Werner Heisenberg demonstrated that on a subatomic level, there is no such thing as 'exact

sciences,' so to on the macroscopic level must we realize that experimental isolation imposes an inherent limitation on our ability to know, since all is interconnected in a very real way.

3. Human beings are on-going dynamic, shifting, changing field entities that serve as a matrix for the flow through of biological substances and various simple chemicals. In this light, chemistry represents a scalar property requiring the organizing influence of 'the field' to give it direction.

According to Dr. Henry Margenau, former Eugene Higgins Professor of Physics and Natural Philosophy, here at Yale,

> Of all the known forces it is only electromagnetic, or electrodynamic fields which can act as signposts to direct such continuous chemical, metabolic, or molecular transformations in the system--fields which in fact appear to underwrite the development of structure even prior to any known chemical reactions.[93]

4. The cyclic fluctuations of EM energy is rhythmic, and there is a synchronicity in this flux that occurs at all measurable levels i.e. subatomic to galactic.[94] Moreover, disturbances in the EM fields at one level of organization, eg. solar, will have an effect on the EM fields at another level of organization, eg. the human body. If H. S. Burr had known where to place an electrode on his body, he would have seen that the energy potential at that point would have

been synchronous with the cyclic fluctuations of his measurements in the trees, air and earth!

If there is any measure of truth in the above statements, then what is lacking is a model which predictively displays the dynamics of electromagnetic field interactions with particular regard to health and the human body. Only correlations are recorded in the literature at this time.

V. TOWARDS THE DEMYSTIFICATION OF AN ART

> The Yellow Emperor's Classic of Internal Medicine (Huang Ti Nei Ching Su Wen) is in reality a book dealing with electromagnetic field interactions within and without the human body.
>
> Ling Y. Wei

Well, what does modern physics have to say about the meridians and acupuncture points? From what has been said thus far, it should be clear that they are tied up with electromagnetic phenomena within and without the body. And, indeed, they may be.

In 1950, Yoshio Nakatani, while still a medical student in Kyoto, Japan, undertook to study the problem of meridians and devised a simple method of measuring skin resistance. He discovered that on the skin there are a series of points at which the resistance was lower than the surrounding area. This effect was particularly pronounced in the unhealthy state. By taking skin resistance measurements in various patients with different kinds of diseases, Nakatani was able to locate most of the highly conducting points and thus the lines connecting them. To his amazement, all the points and lines in his map fell into positions of the acupuncture loci and meridians as defined by the Chinese.[95]

A similar event took place in Germany in 1953. Reinhold Voll used these findings to develop electroacupuncture. Since

then both Nakatani and Voll have refined their techniques for diagnosis and treatment. Voll, with the use of a transitional dermatron (modified volt-ohmmeter) can accurately locate points and is then able to make a diagnosis as to the underlying pathology based on the range and stability of the needle deflection and the speed and time course of this deflection. Voll further classifies these factors into subunits, each of which corresponds to certain symptoms.[96]

Similar work, in the verification of acupuncture loci and meridians in the Western hemisphere, has also been performed.[97,98,99] While a correspondence has been made between acupuncture and muscle motor points, nerve plexi, and superficial cutaneous nerves about 16% of the points of the Ching-Lo (meridian) network lie in tissues unrelated to the nervous system.[100] The point here is that the Ching-Lo network may include the nervous, circulatory, and lymphatic system but the level at which this network mediates its effects is more fundamental than any of these.

In 1962, Becker et al. 'discovered' a primitive data transmission system within the human body in which D.C. electronic signals are generated and distributed.[101]

> This system has been related to several physiological processes such as: the pattern of D.C. potentials exhibited by living organisms both grossly (Becker, 1960) and within the central nervous system (Becker, Buchman, and Slaughter, 1962), growth and healing process of several types (Becker,

> 1963), and levels of consciousness such as hypnosis (Friedman, Bekcer, and Bachman, 1962) and anesthesia (Becker, 1962).[102]

Indeed, Becker is responsible for the use of electromagnetic fields in the healing of fractures because it was shown that the fractures were more electronegative than the surrounding tissue. Furthermore, both Becker and Pressman note that it is this primitive data transmission system which interacts with and may be modified by electromagnetic fields.[103,104]

The concept of DC potentials within the human body is not a new one by any means. Galvini in the mid 1700's held that electricity was the vital force distinguishing living from non-living and that actual electric currents flowed in all living things, conveying information and controlling life functions. With the conretization of the classical school of thought, the focus was placed on chemical processes, and the idea of electric currents was not seriously worked with. However, with the recent advances in solid state physics, it has become quite possible to consider actual electronic processes in living organisms based upon the solid state properties of organized structures within tissues and cells.

> In such processes current is carried by electrons or 'hole' (defects in the crystal lattice assumed to carry a positive charge). While the current carriers have high mobility, the current capacity is low and such materials are limited to small

> currents. The highly organized state of cells and tissues revealed by electron microscopy appeared to make them fully capable of processing such properties as semi-conductivity.[105]

Becker goes on to write:

> The high mobility of charge carriers makes them particularly susceptible to external electrical and magnetic fields, and charges in these fields will produce corresponding pertubations in the DC potentials in a semi-conducting lattice. It has been reported that magnetic field reversals in the past were accompanied by major biological events and such a semiconductor system would provide an effective environmental linkage mechanism in this case.[106]

Becker has further shown that the conductance field plots are very precise and remarkably well-organized for many of the acupuncture points he has studied.[107] There also appears to be a proximo-distal negative gradient along meridian lines and a dorsi-ventral negative gradient on the extremities.[108] Predictably, there is a circadian fluctuation to the electrical potential over acupuncture loci studied. Additionally, a short periodic cyclic fluctuation (15 minutes) was noted in the total overall DC potentials at and in the immediate vicinity of acupuncture points.[109] It will be interesting to see the results of experiments which test the ideas that the various meridians are maximally energized for two-hour periods during the day.

Within this context, acupuncture meridians, i.e. the Ching-Lo network, serve as transmission lines and acupuncture

points become 'booster' amplifiers, restoring signal strength and maintaining intelligibility over distance. The acupuncture points are points where 'Ch' i comes to the surface' and can be modified by EM fields in the environment or those artificially created by needling or electroacupuncture. In actuality, the surface potentials are just points in a field which penetrates the entire human body. This DC potential is the manifestation of Ch'i in the internal environment. Becker postulates that it is the perineural cells, i.e. the Schwann cells peripherally and the satellite and glial cells centrally which serve as the transmission lines and centrally integrating areas.[110] S. Hameroff, at Tucson Medical Center, postulates that the microtubular system is the anatomical substrate. He cites evidence to suggest that microtubules are the right size, shape and configuration to be tuned resonators, and electrical waveguides for atmosphere UV radiation which is refracted by the stratum corneum.[111]

Key to the comprehension of how acupuncture was developed is the realization that it is a product of the right side of the brain's conception, perception and interpretation of reality.

> The Ancient people of China did not work by summarizing a series of separate results and systematizing them into an abstract conclusion, but went further and interpreted each isolated fact from a general conception which gave it position and meaning as part of the whole.[112]

Manford Porkert, an MIT professor writes in his Theoretical Foundations of Chinese Medicine,

> Chinese Medicine, like other Chinese sciences, defines data on the basis of the inductive and synthetic mode of cognition. Inductivity corresponds to a logical link between two effective positions existing at the same time in different place in space. (Conversely causality is the logical link between two effective positions given at different times at the same place in space). In other words, effects based on positions that are separate in space yet simultaneous in time are mutually inductive and thus called effects.113

This statement should bring to mind Einstein's superluminal energy transfer, mentioned earlier, and the experiments of H. S. Burr, demonstrating the synchronous electrical readings in trees, the air, and earth.

Through induction, the Chinese developed an understanding of health around a system of correspondence in accordance with conventional standards of value.

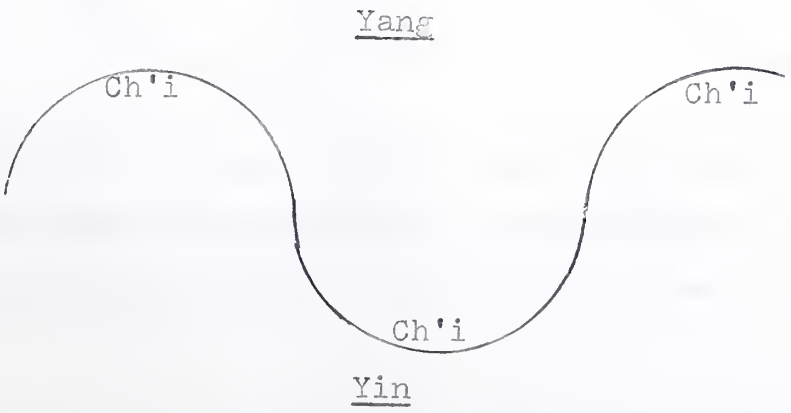
> Jung has coined the term 'synchronicity' to designate the particular logical principle that forms the basis of Chinese thinking. Needham states that what he calls 'correlative thinking' underlies all Chinese science and defined the basic action concept 'resonance.'114

In this context, the comprehension of the workings of Yin and Yang in the human body parallels physiology, albeit crudely. I will use Porkert's term for this interaction, phase energetics. The difference between physiology and phase energetics is that the latter, being of inductive origin,

integrally relates the individual to everything in his environment (link between things existing at the same time but separate in space).

Phase energetics not only applies to Chinese but to all areas of traditional Chinese thought. It lays the foundation for the book of wisdom, the I Ching, called by Confucious the perfect book. In this inductive system, phase energetics gives rise to the conventional standard of value upon which all correspondences are made.

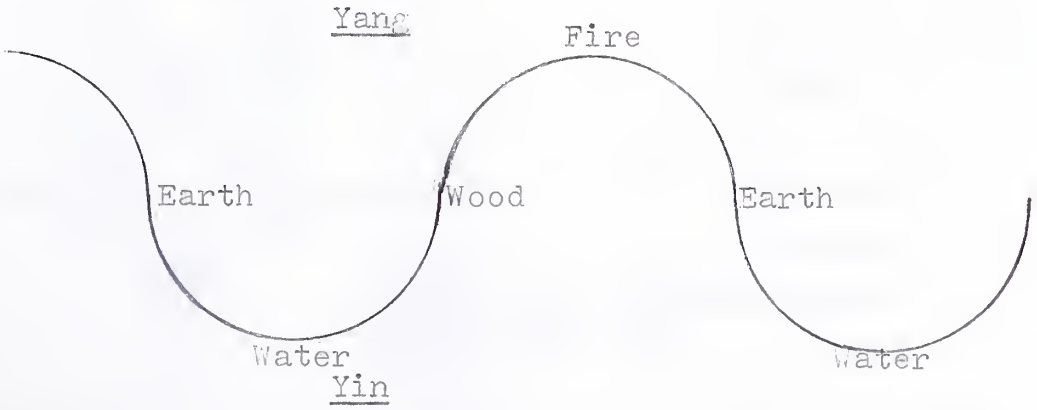
To begin our discussion of phase energetics, we first need to know where Yin stands in respect to Yang and visa versa. They are to be seen as compliments manifesting in all things and events. Their complimentarity may be expressed (Yin - Yang) as internal - external, deficiency - excess, base - acid, parasympathetic - sympathetic, anabolic - catabolic, structive - active, etc. As i have shown, these are polar aspects of any system, and there cannot be one without the other. As both express opposite functional qualities, they cannot manifest themselves at the same given time. This is represented below and should be viewed from the point of view of an electromagnetic wave.



In the introduction to the text of the Yellow Emperor's Classic of Internal Medicine, Veith writes,

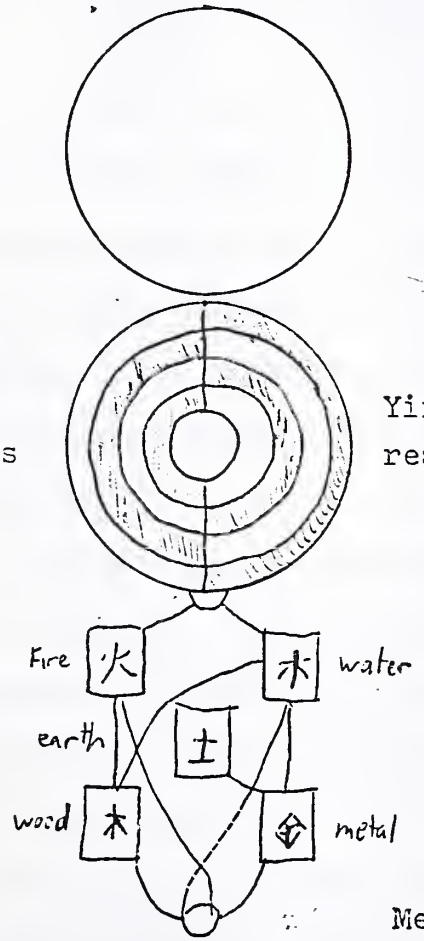
> As can be expected, the affinity of Yin and Yang to each other was held to have decisive influence upon man's health. Perfect harmony between the two primogenial elements meant health; disharmony or undue preponderance of one element brought disease and death. . . But man is not helplessly exposed to the whims of Yin and Yang. Man had received the doctrine of Tao as a means of maintaining perfect balance and to secure for himself health and long life. In the I Ching, the most ancient of the Five Canons it is said, 'The Yang and Yin of the Universe are called Tao.' This knowledge of Tao and of the workings of Yin and Yang was considered even strong enough to counteract the effect of age. Thus we find it said in the Nei Ching that those who have the true wisdom remain strong, while those who have no wisdom grow old and feeble. The ideal age expounded by the Nei Ching was one hundred years.115

Using this two pole model, the Ancients established conventional standards of value defined by their location on this cyclic flow of Ch'i.



Within this model, a fifth element is added, Metal. In ancient China, Heaven (Chien), the metaphysical world, was associated with gold (chin). The latter became its emblem

and the generic word for metal.[116] The Greeks, Egyptians and ancient people of Indus-Kush (India) also had four 'elements' with the addition of a fifth one (Greeks-Apeiron or Aether; Indus Kush-Akasha).[117] The following diagram depicts the movement from the subjective realm of the Creator to the energetic phase of the five elements.



top: Thai-Chi, Grand Ultimate; Prime Matter; Cosmic Egg.

Center: Yin-Yang, Negative and positive phases Of Cosmic Energy; Cosmic Soul

Bottom: Five Cosmic Elements; Creation.

Metal= Gold= Akasha= Aether
Wood= Wind= Air

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Porkert calls these standards of value the five evolutive phases which in clinical circles are commonly referred to as the five elements.

> The Five Evolutive Phases as their name implies, constitute stretches of time, temporal segments of exactly defined qualities that succeed each other in cyclical order at reference positions defined in space. Or couched in terms closer to practice the E.P.s define conventionally and unequivocally energetic qualities changing in the course of time. They typify the qualities of energy by the use of five concepts (wood, fire, earth, metal, water) because the richness of their associations, are ideally suited to serve as the crystallizing core of an inductive system of relations and correspondence.119

In China, this model is called Wu-Hsing. Wu means energy matter, among other things, and Hsing means motion, action and interaction. This model first appeared in the Hung Fan (Great Plan) chapter of the Shu Ching (Historic Classic). The latter is dated at about 1000 B.C. The fact that Wu-Hsing appears in a historic classic speaks for its antiquity.[120]

Within the electromagnetic energy field which constitutes the human body, the five evolutive phases are imposed on energetic channels or meridians (Ching-Lo) through which Ch'i flows, reflecting the rhythm of Yin and Yang.

While there are over seventy meridians in the body, our discussion will only deal with what are called the 12 regular meridians. Six are Yang and six are Yin. While 11 of them were named after organs, when translated by Westerners, it would be incorrect to look at these meridians as anatomical/physical constructs. Porkert writes,

> Whereas in anatomy Western medicine, causal and analytic, primarily describes aggregate carriers (or substrata) of effects, inductive, synthetic Chinese medicine is primarily interested in the fabric of functional manifestations of the different body regions.[121]

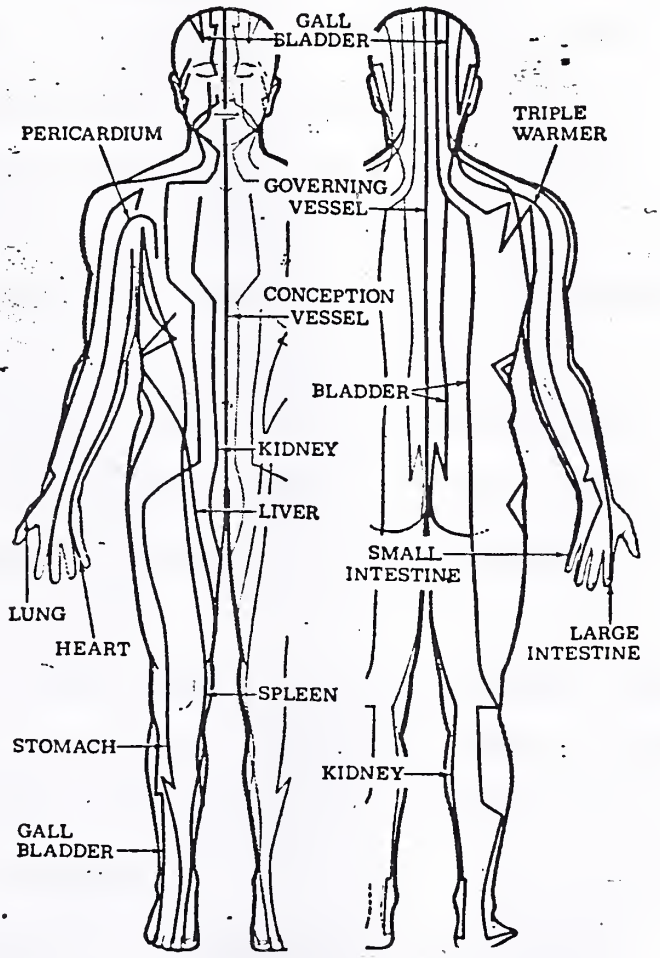
Porkert calls the counterpart to Western anatomy "orisnocography.' He writes,

> The ambiguity of the technical term 'orb' (orbis) reflects almost exactly that of the Chinese term tsang which refers on the one hand to a bodily substratum with ill-defined material and spatial contours, and on the other hand to a physiological function associated with the substratum and qualitatively defined in time with precision and subtlety.[122]

Lacking this comprehension, Western writers tell us that the Chinese had an ill-defined comprehension of anatomy not perceiving (the writers) that something else was being represented.[123] An anatomical correlation that does come to mind is the one that occurs between the pathway of the orbis cardialis and the pain of coronary occlusion. In the latter, pain radiates down the inside of the left arm the very course traversed by the cardiac meridian. One might ask if this is really an anatomical correlation in the strict sense of the word.

As i stated above, the 12 meridians are divided into Yin and Yang meridians. The six Yin orbs are commonly referred to as the heart, spleen, kidney, liver, pericardium and lung. The Yin meridians are associated with structive potential. They store Ch'i (energy) and are 'solid' orbs. The six Yang meridians are commonly referred to as the gall

bladder, bladder, triple heater, small intestine, large intestine and stomach. They transmit and assimilate but do not store energy.



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According to the Chinese, the meridians are not separate but follow one after another. Moreover, each meridian has a two-hour period during which it is most energized.

Lung 3 to 5AM - - - - - Large Intestine 5 to 7 AM

Stomach 7 to 9AM - - - - Spleen 9 to 11AM

Heart 11 to 1 PM - - - - Small Intestine 1 to 3 PM

Bladder 3 to 5 PM - - - - Kidney 5 to 7 PM

Pericardium 7 to 9 PM - - Triple Heater 9 to 11 PM

Gall Bladder 11 to 1 AM - Liver 1 to 3 AM

In theory, in terms of the system of correspondences, the triple heater and pericardium are not included as they are the manifestations of endogenous processes which are effects of the interactions of the Five Evolutive phases. The following diagram relates the EP's to the Yin and Yang orbs of the body. Included are the set of correspondences which relate the forces of Nature (wind, heat, humidity, etc.), the emotions, colors etc., to the evolutive phase which has the greatest functional connection to it. These correspondences also serve as a basis for the discussion of symptomatology and treatment.

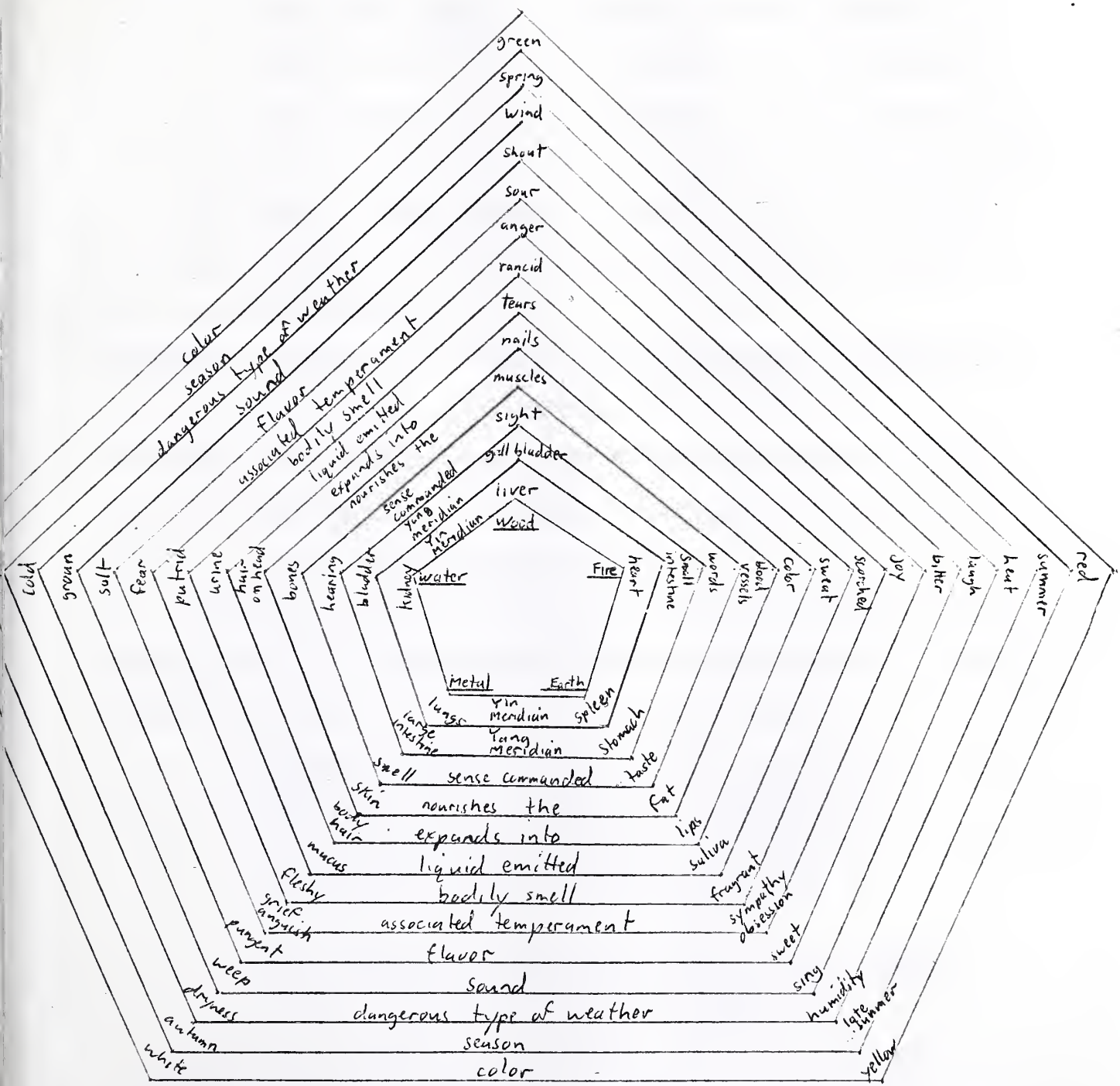
Some of these functional relationships might seem obvious while others are not so. The effect must be comprehended at the level of Ch'i. We must also remember that we are dealing with orbs, not organs.

Liver - nourishing the muscles, i.e. glycogen

Kidney - is important in the mineralization of bone via the regulation of calcium and phosphorus

Lungs and Large Intestines - epithelial tissue produces mucus

Heart - with the heat of the summer many susceptible individuals have cardiac problems


color
season
dangerous type of weather
sound
flavor
associated temperament
bodily smell
liquid emitted
expands into
nourishes the
sense commanded
yang meridian
yin meridian
Wood
Fire
Earth
metal
water
yin meridian
yang meridian
green
spring
wind
shout
sour
anger
rancid
tears
nails
muscles
sight
gall bladder
liver
cold
grass
salt
fear
putrid
urine
hair on head
bones
hearing
bladder
kidney
small intestine
heart
blood vessels
odors
color
sweat
scorched
joy
bitter
laugh
heat
summer
red
white
autumn
dryness
weep
pungent
grief anguish
fleshy
mucus
body hair
skin
smell
large intestine
lungs
spleen
stomach
taste
fat
lips
saliva
fragrant
sympathy obsession
sweet
sing
humidity
late summer
yellow

Spleen - the pancreas is a part of this orb and its association with sweets is mediated through insulin. An excess of the flavors is thought to be damaging to the element to which it belongs. Not so obvious is the fact that the onset of insulin dependent diabetes peaks in late summer and winter. This is actually consistent with more complex accounts of Chinese 'pathogenesis'

Kidneys - potentially ototoxic aminoglycosides (hearing) are also toxic to the kidney tubule mechanism

Kidneys - this orb includes some functional aspects of the adrenal glands including the release of epinephrine as part of the fear response

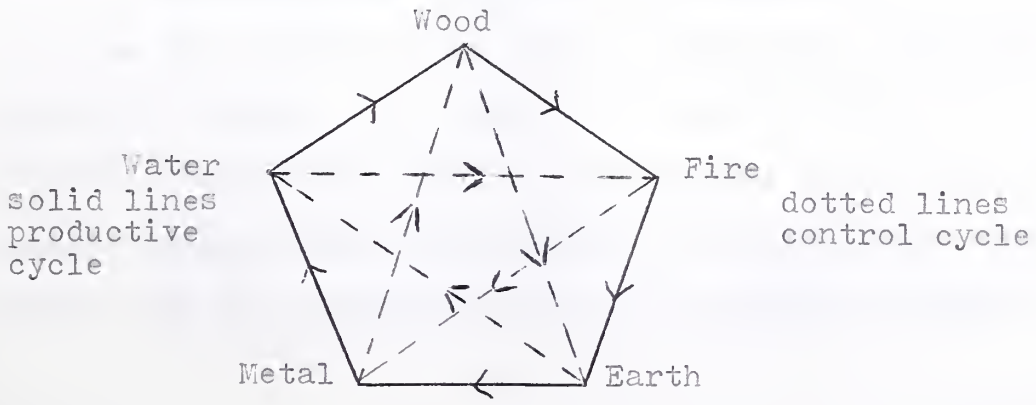
All of these functional relationships are explained in detail within the Nei Ching and other Chinese medical classics. Here is an example of the way this might appear,

> Thus one is able to smell only if lung Ch'i penetrates the nose; one can distinguish the five colors only if liver Ch'i penetrates the eyes; one can taste only if heart Ch'i penetrates to the tongue; one can know whether one likes or dislikes food only if spleen Ch'i penetrates the mouth.125
>
> The capability of the seven holes (eyes, ears, nose, mouth) depends upon the penetration of the Ch'i from the five solid organs.126

The idea of Ch'i penetrating a particular sensory organ does not seem adverse to physiological principles from my vantage point. The relationships described in physiology characterize the interaction of matter energy at a certain

level of organization. But even on this level, the body reflects the fluctuation of Yin and Yang. We see this manifested in the diastole and systole of the cardiac cycle and more pertinent to the above quote we must come to understand that nervous enervation within the body follows a wave pattern in which information (Ch'i) is translated into action or rest (Yang or Yin). While Western medicine has dissected the workings of structures from the molecular standpoint, the Chinese have come to understand function from the backdrop of the larger field.

Within the Wu-Hsing model, there are energy matter conservation laws that are expressed by production and control cycles. Each element is connected to the other four elements by two production and two control processes. Each of these processes is not independent, but is interfered with or counteracted by some other process. The interconnections and interactions in the Wu Hsing diagram make excellent pictorial representations of the Yin - Yang balance.[127]



On a gross material level, we see that water gives rise to the growth of plants (wood) which nourishes fire. Burning of wood makes ash (earth) and the melting of metal reduces it to liquid (water). In the control processes, it is self-explanatory that water quenches fire; fire can soften metal and metal can cut wood. The other two control processes (wood-earth-water) may be understood from the fact that wood can preserve earth in shape (i.e. by preventing it from being washed away by rains and floods) and that earth (rock, clay and cement) can hold or block water.[128]

Within this context, Yin would be the control process and Yang the productive process (structive-active).

> Under a condition of equilibrium (i.e. the condition of Yin and Yang balance) each of the five elements can neither be destroyed completely nor can be created indefinitely in the Universe. The Wu-Hsing diagram also makes it very clear that when one element is destroyed it is transformed into another element, that is, mass is conserved. The mutual production and control processes among the five elements not only represent the vital forces in the Universe, but also embody the fundamental laws governing the functioning and survival of man's world. Thus in the broadest sense, the Wu-Hsing model is the simplest form of a dynamic model of both the macrocosmos and the microcosmos.129

Now that there can be little doubt that acupuncture has a scientific basis, the question of 'how did they know' arises. As this is beyond the scope of this paper, it will only be lightly touched upon in the appendix of this paper, when i will suggest that the theoretical basis of Chinese medicine is also

embodied by other ancient non-Western cultures. Let us first consider some of the implications of electromagnetic field theory with regard to pathophysiology, diagnosis and treatment in both Eastern and Western medicine.

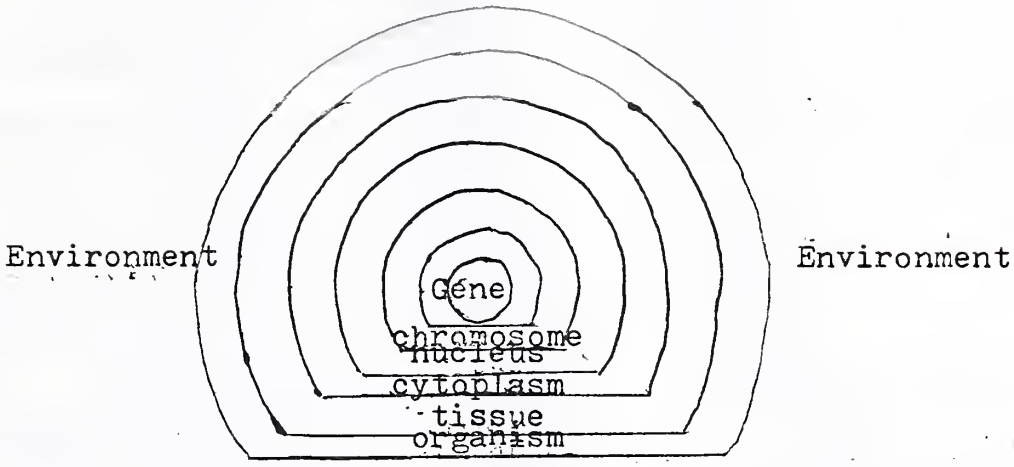
Within traditional Chinese practice, variations in the 'outer Ch'i' (EM fields 'outside' of the body) is given considerable attention in the Nei Ching in terms of its effect on human health. The adjectives describing the variations in 'outer' Ch'i are cold, warm, hot, windy, dry and wet.

Clearly, the first three (cold, warm, and hot) indicate the air in the three ranges of sunlight intensity arising from temperature gradients. The dry and wet Ch'i signify the air with lower and higher contents of moisture. What we see is that the conception, perception interpretation of reality on the part of the ancient Chinese allowed them to take into account the weather and its effect on the human body.

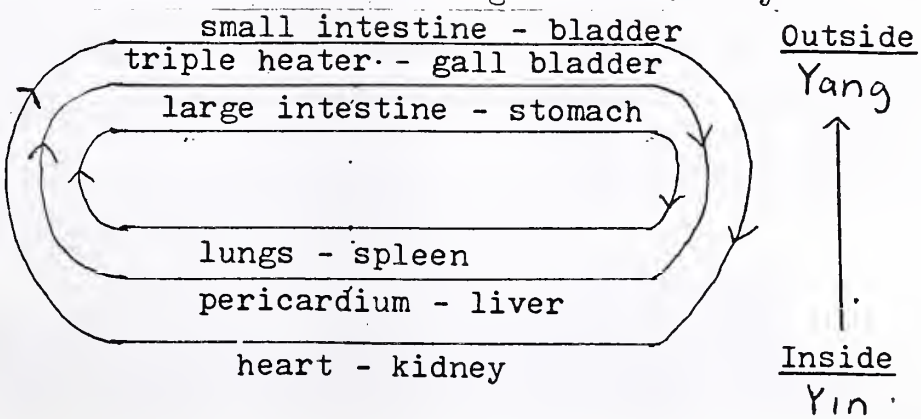
Interestingly enough in 1961, Weiss proposed a scheme of interactions within an organism, that also can be applied to the actions of environmental EM fields on the organism. That is, the organism must have protective mechanisms that either do not transmit electromagnetic energy of a disturbing nature or are able to modify them so disturbances do not take place. Weiss points out,

> No outer agent can influence any of the inner shells except through the mediation of the shells in between, which may or may not modify that factor during its inward passage. Conversely, products of inner systems may not

reach outer shells as such but may be significantly screened and altered in transit.130



Within the traditional Chinese approach to health, the body is organized in a similar manner. As stated earlier, the meridians are interconnected. While the five element theory classifies the 12 pairs of meridians into five categories and utilizes clinical laws for the selection of meridians and loci to be utilized, the Three Yin - Three Yang system organizes the human body into different energetic levels. Within this system, meridians are paired so that the combinations run the entire length of the body.[131]



It would be a mistake for us to say that the Three Yin - Three Yang system represents only a subdivision of one of Weiss' concentric circles. The Chinese conception is a vitalistic one in which the various levels of Weiss' diagram, from the gene to the environment, are taken into account within each energetic level of the Three Yin - Three Yang system. As pointed out earlier, the interaction of Yin and Yang occurs at all levels of energy matter.

Within traditional Chinese therapeutics, disturbances within the body caused by 'outer Ch'i,' or what is now referred to as perverse energy, have diagnostic symptoms which manifest at various levels of the Three Yin - Three Yang system.

Using this paradigm, information that allopathic physicians are not systematically able to use, i.e. problems that flare with wet or humid weather, now becomes meaningful and translatable into terms that will benefit the patient. Clearly, phase energetics is an area which certainly needs to be investigated more thoroughly. It is actually the key to the comprehension of many ancient religions and symbols. Porkert's MIT group feels that its inadequacies are without exception due to the inadequacy of its technical foundation. As to the theory itself, Porkert writes,

> . . . for the basic pattern of phase energetics is worth taking seriously as a paradigm for the further development of medicine. Taking into account the complex nature

> of phenomena described, phase energetics offers a simple, transparent, and rather consistent mode of explanation for climatic and other macroscopic influences in physiology. It describes systemically unequivocal relationships, which may be tested by experience, between macrescopic events on the one hand and physiological, immunological, and pathological conditions on the other.[132]

In clinical practice, the acupuncturist pits his or her skill and the vitality of the patient against the 'perverse' form of energy penetrating that person's living space or to re-equilibrating a self-perpetuating internal functional disturbance. It should be remembered that acupuncture is just one tool in the arsenal of the 'traditional' practitioner. However, reliance on China's formidable pharmocopeia is still subject to the same application of the harmonizing of Yin and Yang in the body. In fact, using this approach, the Chinese had devised a technique for the extraction of hormones from urine to treat infertility in 1025 AD.[133]

As mentioned earlier, the vibratory interaction of Yin and Yang or the field character of the body varies according to the area in question. The Chinese express this as different manifestations of Ch'i. While Porkert describes no less than 32 forms of Ch'i, here is an abridged English version.

Hsien-t'ien ch'i - inherited ancestral energy

Yuan ch'i - the active part of Hsien-t'ien ch'i

Tsun ch'i - ch'i in lungs extracted by air

Ku ch'i - ch'i extracted from food

Chen ch'i - true and nourishing ch'i to which Ku ch'i and Tsun ch'i contribute

Ching ch'i - energy circulating in the meridians differentiated out of Chen ch'i

Wei ch'i - defensive energy differentiated out of Chen ch'i

Cheng ch'i - a reservoir of reserve energy, stored in the kidney orbs, to be drawn on when required by the body. It is a refined portion of Chen ch'i which has not differentiated into Wei ch'i or Ching ch'i.[134]

Hsien-t'ien ch'i is the Ch'i of the sperm and ovum. This Ch'i cannot be increased but it can be weakened by excesses imposed on the body. In the fetus, this is the only Ch'i. The other Ch'i conversion functions (triple heater system) are carried on for the fetus by the mother.[135]

Yuan ch'i, the active element of ancestral energy, acts as a catalyst (this brings to mind the idea of certain genes of an individual's gene pool being expressed). It circulates from the kidney orbs by what are known as the eight extra meridians and transmutes one form of Ch'i into another.[136] Note that people in chronic renal failure, on dialysis, are infertile.

What is being described here is not very different from Western physiology, except the latter is more concerned with phenomenal interaction at the molecular level. While some of the relationships posed above make sense from the

standpoint of Western physiology, i.e. Ku ch'i and Tsun ch'i giving rise to Chen ch'i, others such as Chen ch'i giving rise to Ching ch'i, energy circulating in the meridians; Wei ch'i, defensive energy (reticuloendothelial system?); Cheng ch'i, energy stored in the kidney orbs, may not be as clear. Perhaps it reflects a relationship as yet not uncovered by Western medical research. It may prove very enlightening to evaluate Porkert's 32 transformations of Ch'i with an eye toward their physiological correlates.

With regard to diagnosis, emphasis is placed on the history, evaluation of the tongue, point sensitivity on the body and pulse diagnosis. The latter is the most fascinating. The pulses measured represent the fluctuations of Ch'i in the 12 regular meridians of the Ching-Lo network.

The practitioner of this art palpates three positions bilaterally over the radial artery. The positions are separated by a half inch, with the middle position being roughly opposite to the radial apophysis. Each position has a superficial and deep position representing the Yang and Yin orbs respectively. The superficial position has been compared to the sensation of the arterial wall and the deep position to the sensation of the flow of blood within the artery. A description of the pulses in the Nei Ching may read as follows,

> One should feel whether the pulse is in motion or whether it is still. When the upper pulse is abundant then the rebellious Ch'i causes a swelling in the abdomen. If the pulse appears to stop then Ch'i has decayed.137

In the book Acupuncture, Dr. Felix Mann describes 28 different pulse qualities which are appreciable to master.[138]

In Western medicine, the arterial pulse is actually an energetic pulsation ∿ resulting from the contraction of the heart, the distensibility of the arterial vessels, and the rebound of the previous pressure pulse, as opposed to the flow of blood. Perhaps the budding field of holography, where information is stored in the interference patterns of waves, could render an explanation for the way the energetic vibration or wave pattern of one orb could affect the pulse palpated at the radial artery.

One should not be surprised that different orbs are represented by different points along the same artery. This situation resembles the monochord of Pythagorus in which he demonstrated the relationship between math and music. If one plucks this chord, each position relative to the point of contact, has a particular relationship with that impulse which can be represented mathematically or as a musical note.

Working in a clinical setting with a skilled acupuncturist, i have seen this technique used repeatedly in conjunction with other Chinese diagnostic techniques. Though skeptical at first, i became impressed as i began to see patients improve on the basis of the acupuncturist's diagnosis. I must add that i could consistently note changes in the character of the pulse following treatment. Mann writes,

arm	left wrist			finger tips
	water element	*	wood element	* fire element
superficial	bladder	*	gall bladder	* small intestine
deep	kidney	*	liver	* heart

arm	right wrist			finger tips
	fire element	*	earth element	* metal element
superficial	triple heater	*	stomach	* large intestine
deep	pericardium	*	spleen	* lungs *

> A doctor skilled in its practice would--without even speaking to or seeing the face or body of his patient and with no more contact than a hand thrust through a hole in a curtain to give access to the radial artery of the wrist--be able to arrive at a reliable diagnosis in a matter of minutes. It can be used to confirm a diagnosis already arrived at by clinical and laboratory methods. It can be of very great benefit in a case, where, although the patient is obviously ill, it has not been possible to arrive at a conclusive diagnosis in spite of thorough clinical and laboratory investigations.[139]

Of note is that during the mid-seventies the personal physician of the Dalai Lama of Tibet, Yeshi Dhonden, was invited to make rounds at a teaching hospital here at Yale. He examined a female patient selected by a member of the house staff. Her diagnosis was unknown to him and the house-staff. After long inspection of her body and palpation of her pulse, he personally examined a specimen of her urine,

vigorously stirring and smelling it. His diagnosis was that she had an unwanted open gate and eddying currents of an eroding and flooding river, which actually described a congenital heart defect and its ensuing cardio-respiratory impairment. The diagnosis was confirmed by the only attending physician who was familiar with her case--congenital heart disease--interventricular septal defect, with resultant heart failure.[140]

As i have pointed out earlier, the refinement of electroacupuncture has allowed for physicians to use it as a diagnosic tool and thus skirt around sphygmology (study of the pulse), a skill that takes many years to develop.

The use of skin potential as a diagnostic test is something that is not new to Western medicine. In the 1940's and 1950's experiments were performed within OB/GYN departments around the country to test the hypothesis that cancer altered the measurable electrical skin potential in women. It was demonstrated that when measures of these potentials were properly made, obvious differences in the field properties of patients, with and without malignancy, can be determined. A polar reversal of the field forces between the cervix and ventral abdominal wall was shown to exist in most patients (98.7%) with malignancy involving the female generative tract.[141] Following successful surgical treatment, the potential reversed itself. No reversal took place after radiation therapy or in a women who underwent a radical procedure.

It was thought at the time that this technique could be very useful in general screening and in follow-up of post-surgical patients.[142] These findings held up after considerable experimentation on thousands of women. What ever happened to this research? The implications are profound. For one, such a technique could have been carried over into other diagnostic areas, i.e. colon, prostate cancer, etc. Such work is only to be found outside the realm of standard medical practice today--people using the Voll system and Nakatini's Ryodoraku. Of note is that researchers at that time, while postulating that cancer was the result of an alteration of the individual's EM field, did not attempt to affect a physical change by altering the field. They relied on the scalpel.

In another interesting series of experiments performed here in the days of Max Taffel and Samuel Harvey, it was shown that there exists a voltage gradient between the fingers of the left and right hand. One particular medical student showed a potential gradient higher than all the rest of the subjects. It was discovered that he had a history of emotional instability. Before the end of the year, he became psychotic and had to be remanded to an institution.[143]

These findings parallel the work of Akabane in Japan. In 1953, he discovered, by accident, that the sensitivity to heat of each acupoint was different from the other points. This effect was particularly pronounced during sickness. By

using the terminal and beginning points of acu-meridians, which include the tips of the fingers, Akabane could diagnose the state of disharmony within the meridian and hence the state of illness of the related organs. He would simply note which meridians showed the greatest potential gradient between the left and right side.

This technique has actually been refined by Hiroshi Kotoyama, a scientist with doctorates in physiology, philosophy, and psychology. Motoyama has developed a machine which measures the energy flow within the meridian system. The devise, called the "Apparatus for Measuring the Functioning of the Meridians and Corresponding Internal Organs" (AMI),

> . . . reads the meridians via twenty eight electrodes attached to the end points in the fingers and toes. A computer compares each reading with criteria for normality in major organ and control systems. These criteria were established during research on 5,900 subjects.
>
> AMI distinguishes between chronic and acute disorders of the heart, lungs, liver, stomach, kidney, spleen and other organs. It also detects specific disease tendencies. The machine's reliability has been verified by conventional diagnostic procedures.[144]

In line with the above is the recent study performed at the Department of Anesthesiology at the Tokyo Medical and Dental University in Japan. It was demonstrated that in patients with histologically documented stomach cancer vs. a 'non-stomach cancer' group vs. a healthy control group, the latter two displayed statistically different heat sensitivities

than the stomach cancer group. What's more, the stomach cancer group had a characteristic pattern of meridian imbalance.[145]

These examples are given here to reemphasize that EM fields in the context of health and disease are not new to the allopathic medical tradition. Not only can correlations be made between field states and bodily pathology but there is some suggestion that EM fields can be of predictive value as well. At present, prognostic indicators with regard to disease states are dealt with in terms of the physical nature of the affliction and the structures involved. In many instances, certain signs and symptom complexes are correlated with a particular outcome. If EM fields are indeed responsible for the ordering of physical structures, as Dr. Henry Margenau asserted, then aberrations in the EM field that constitutes an individual, whether measured by pulse diagnosis or instrumentation, should, in many instances, be of predictive and prognostic value. Clearly, EKGs and EEGs have been used in this respect. However, as i have pointed out, EM fields, except for the repair of fractures, have not been fully utilized therapeutically. All the evidence i have thus far presented points to the conclusion that physical changes in the body can be brought about through the use of EM fields.

I feel that a modality which makes use of EM fields could be of invaluable use in many chronic diseases. In such diseases, the physician, for lack of clear comprehension

of the underlying etiology, is limited to symptomatic treatment in an effort to stave off severe and organ damage. I have personally witnessed patients with hypertension and diabetes receive considerable relief with acupuncture and in some instances no longer require medication. In one particular case, i worked with a women who had been taking 50 units of NPH insulin daily. Within six months of a program which included acupuncture, exercise, and dietary manipulation, she no longer required insulin and her fasting blood sugars were consistently below 125.

If we were to list all the named afflictions of the human body, we would find the suffix itis in a good percentage of these designations, i.e. gastitis, endocarditis, bronchitis, colitis, vasculitis, arthritis, etc. It simply means that that particular structure is inflamed. Pathology teaches us that inflammation is the body's reaction to injury and that it is a necessary step in the healing process which hopefully ends in repair and restoration of function. In many cases, the nature of the injurious agent is unknown or an autoimmune process is diagnosed. The latter still does not identify the initiating agent. What results in these cases is the prescribing of anti-inflammatory pharmaceuticals including steroids, which by definition deny the body the opportunity to repair itself.

I propose that it is well within the realm of possibility that aberrations in the field energetics of an

individual could in and of itself lead to a focal inflammatory process. Already considerable evidence has been cited to demonstrate the cause and effect relationship between EM field changes and alterations of various parameters of bodily function, i.e. cardiovascular disease, leukocyte count, blood pressure etc., as well as the experimental evidence concerning acupuncture. That inflammation too can result from field changes should not distress the conservative thinker.

Clearly, a new era of investigation must begin within the Western medical tradition. For if we ask what causes EM fields to be altered, we are forced to rephrase the question and ask what does not! Western medicine would be thrown into the age of relativity, a world of 'invisible' fields and forces. Even the little understood placebo effect would now have a mechanism to be. Perhaps words like idiopathic and spontaneous remission could be replaced by more meaningful phrases.

Within the context of electromagnetic fields of modern physics even the word medicine itself would take on a 'new' meaning. Its semantical root medi, as in meditate and mediate, implies a centering process, a reequilibration. From the relativistic standpoint, a drug would no longer be synonymous with the word medicine. In fact, no thing, in and of itself, would constitute a medicine, but rather all things would be seen in terms of their potential to have a medicinal

effect. Sound, food, drugs, emotions, thoughts, plants, minerals, etc. would all have to be understood in terms of their field qualities.

Returning to the experimental data on acupuncture, it is no surprise that the different frequencies of electroacupuncture stimulation caused different chemicals to be released (Chapman and Benedetti, Pomeranz and Cheng). Clearly, the field characteristics of the stimulation was the determining factor in what chemical would be released.

In general, the various theories and approaches to acupuncture developed within the classical chemical framework all had some viability because they were measuring effects. That is, they had artificially isolated and focused on points in space-time, within the body, and taken these to be causative phenomena. Though the underlying mechanism was not comprehended its physical effects were to be seen in various chemical systems in the body. The theory employed to organize the chemical data was not the essential factor.

This situation is no different than the early quantum physicists attempting to describe their exploration into the subatomic world of energy quanta, particle position and momemtum, in terms of everyday sense realities. Like modern medical researchers, they were not equipped with the conception, perception and interpretation of reality that would allow them to get to the root of the phenomena they were

exploring, at least not without radically revising some very fundamental 'common sense' notions. As did modern physics, so to must medicine begin to realign its thinking and practice with an 'unseen' world. The statements of the physicists in the section entitled The Roots of Misunderstanding leaves little room for question as to the extent that this must be done.

While EEGs, EKGs and the like are diagnostically employed, today's doctors, under the weight of a mental orientation fostered in an extremely left-sided (hemisphere) educational system, take an overly mechanical approach to health and disease. Acupuncture is regarded as a dubious novelty and discussion of EM field theory draws blank stares. Indeed, patients often become diseased organs to be treated. Both patients and doctors have been systematically denied the full benefits of modern physics' accomplishments and those of non-Western cultures.

On a more optimistic note, the technique of Nuclear Magnetic Resonance (NMR), which has been used since the 1950's to study matter at the molecular level, has recently been applied to the mapping of the internal structure of the human body. It employs radio frequency radiation which delineates the distribution density of protons in cellular water and lipids. NMR has the advantage of being non-invasive, avoiding the use of ionizing radiation, penetrating bone without attenuation and thus far being without known hazards.[146]

However, from the vantage point of the material thus far presented, i would not be surprised if the fields generated by the NMR were shown, in some instances, to affect various parameters of body chemistry. As promising as NMR appears to be, it must still be relegated, as with EKGs and EEGs, to the area of diagnosis.

Pressman does note that EM fields have been employed therapeutically on a limited basis. While the basic research has been carried out in Europe and the Soviet Union, the techniques are slowly being recognized in this country.

Treatment with EM fields of various ranges either entails contact application of the EM field to the patient (diathermy) or action at a distance (UHF therapy). "Microwave therapy has been shown to be effective for the treatment of musculoskeletal diseases, various eye ailments, gynecological diseases, and tooth diseases."[147] EM fields have also been found to have a stimulating effect on hemopoieses, which has proved useful in connection with radiation injry.[148] While EM fields have been shown to have an inhibitory effect on malignant tumors in experimental animals, further investigations are pending.[149] It will be interesting to see whether artificial EM fields will be used to offset the deleterious effects that magnetic storms have been shown to have with regard to cardiovascular disease.

A related area that has shown promise is Kirlian Photography. In Kirlian Photography, a high frequency

electrical field is established between two plates of a high frequency generator's oscillation circuit. These plates are coated with photographic film and the object to be photographed is placed between the plates. The high frequency discharge between these symmetrical plates corresponds to the object's topographical configuration. In some cases, as with photographing a man, only one plate is needed with the man, connected to ground, serving as the other plate.

The Kirlians have documented that in a high frequency field, auto-electron and auto-ion emission is characteristic of all bodies of nature, including living organisms.[150] An object of inanimate nature will give a characteristic picture secondary to its electrical properties, i.e. degree of conductivity, density, capacitance, etc. It follows, then, that from the electromagnetic standpoint, there would be some credibility to the idea that when jewels, as well as metal and plants, are applied directly to the human skin some electromagnetic influence is exercised over the physical cells!

Since we are dealing with the dynamic nature of living things, change is a constant. As such, the electrical properties of the living organism will reflect these changes. The Kirlians write,

> These channels (paths along which discharges occur) carry the physical, chemical, and dynamic characteristics of the object, transformed into electrical characteristics which are represented on film or on a screen as

> geometric, dynamic colored figures. Since a biological object emitting discharges is a complex electrode, then evidently such discharge channel carried a spectrum of its bioelectrode and its components.151

With regard to this modality's use in the area of health, Ling Wei, Ph.D., a writer with profound insights into acupuncture writes,

> The most interesting feature of Kirlian pictures of living things, be they plant leaves or finger pads, is the aura surrounding the photographed body. The color, brightness and width of the aura depends on the physical and mental health of the living being. For example, the aura of a fresh green leaf is found to be very different from the same leaf when dying. A calm person's finger pad usually has a blue aura, but it turns to red when the person becomes intoxicated. All these results suggest that the inner Ch'i exists in life and it changes with the condition of the living body.152

Not surprisingly, we find that acupuncture stimulation can alter the image of Kirlian photography.[153]

A possible scenario for the use of Kirlian photography as a preventive and precise screening measure might be the following: The Kirlian photograph of a patient could be fed into a diagnostic computer where thousands of standard patterns and their associated pathology, either within the field and the body, or the field alone, could then be matched to the patient's pattern, with the resultant print out of a diagnosis and recommended course of therapy. If such a thing were to occur, clearly acupuncture would have a role to play in the care of the patient.

Without a doubt, the principles of Kirlian photography, in many ways analagous to NMR, opens up a whole new arena of investigation, especially in medicine, botany and biology. Clearly, the all-pervasive nature of electromagnetic fields of Yin and Yang will lead to the further development of techniques which will help man to better comprehend the field character of life.

In conclusion, i must emphasize the point that whether or not electromagnetic field theory, acupuncture, and other field conceptions become acceptable areas of medical research, depends on those in the medical community (and perhaps the pharmaceutical industry) who determine the conceptual and instrumental framework which is accepted by the whole medical community.

I have tried to demonstrate that medicine's current way of defining health and illness serves to shut out as much as it keeps in. The impermeable wall of this conceptual scheme must take on membranous characteristics as Western physicians assess and assimilate the perception and interpretation of reality offered by modern physics and Chinese medicine. Other cultures including the Chinese have done no less with regard to Western technology. In the final analysis, ideas are universal, belonging to no man or society, to be discovered/ received by anyone who is prepared to know.

Perhaps through the aid of electromagnetic field theory, the scientific community will discover that acupuncture is really not a foreign antigen, but rather a familiar friend in foreign clothes. I believe that when the dust finally settles, it will be clear that there is only one medicine in the world. East and West, energy and matter, left hemisphere and right hemisphere are just different degrees of the same thing. And while the left and right hemisphere are capable of functioning independently, without being cognizant of what the other side is doing, a more equilibrated and enlightened existence would benefit all.

> It is probably true, quite generally, that in the history of human thinking the most fruitful developments frequently take place at those points where two different lines of thought meet. These lines may have their roots in quite different parts of human culture, in different times or different cultural environments or religious traditions; hence if they actually meet, that is, if they are at least so much related to each other that a real interaction can take place, then one may hope that new and interesting developments may follow.
>
> Werner Heisenberg

APPENDIX

LOST KEYS

> It is present mankind's false sense of accomplishment that induces it to look down its nose upon the Ancient teachings. Teachings which are the well waters of its salvation. It dies daily of thirst, yet it knows not.
>
> R. A. Straughn

This paper would be incomplete without a brief exposition on the Ancient cosmogonies, which like the cosmogony giving rise to Chinese medicine, is in harmony with the philosophy flowing from physicists' investigation into the nature of that which is.

Fundamental to these non-Western cosmogonies is the orientation which views life hierarchically from the non-material to the material. Their classification systems are always rooted in their perceptions of that which is beyond the physical. In fact, throughout the Ancient cosmogonies of Africa, including the Kabalistical tradition, the physical realm was only one-tenth of manifested reality. Their conceptions rest on the notion that there is an inherent order throughout the span of Creation, from the non-tangible to the tangible. Or, as stated earlier, the cyclic interaction of Yin and Yang is to be seen at all levels. Straughn writes,

> While on the physical plane events and things are infinite in number and infinitely differentiated from each other, they were seen to be the manifestation of a limited number of forces operating in the metaphysical realm.
>
> As these few forces are responsible for the structuralization of the infinitude of things, and the order in which events unfold, they were used by the Ancient Philosophers, represented by symbols, as a means of classifying the host of physical manifestations.154

Within this framework, the physical word is the grossest form of energy-matter or what has been termed spirit.

In these cosmogonies forces of the unseen world, including man's inner world of thoughts and emotions, were also looked upon as things except that their forms were made up of more subtler vibrations of energy matter. It is in this light that EM fields are understood. Of course, never once does the word electromagnetism appear in these ancient constructs and Western anthropologists using a materialistic set of references have tried to reinterpret these constructs in light of their everyday sense realities. Nonetheless, 'primitive' thinking has no more been pigeoned-holed into the philosophical framework of classical physics than has quantum physics. However, the former continues to be maligned by most contemporary thinkers while the latter continues to pave the way for further technological advances.

While the Ancient cosmogonies aimed at helping man to grapple with his outer world by master of his inner world, technologies flowing from modern physics focus on further

manipulation of the environment, never mind to what end. Indeed, today we live with the results of the latter, and in apprehension of what tomorrow will bring.

Let me begin to give more form to the statements i have made above. Central to this work has been the concept of knowing or more to the point, how one comes to know. The word science itself is derived from the Latin word scire, meaning to know.

The process of knowing has been the subject of the deepest philosophical investigations of all people. In the West, the scientific method constitutes the rules by which one comes to know something. Other cultures have also derived systems by which one comes to know.

> This process was called by the Rishis (precursors of Hinduism), Jnana yoga, by the Greeks gnosticism, and symbolized by the Egyptian sages by the ankh. A study of the ancient linguistics will reveal a common semantical key running through all of them; JNana, GNosis, aNKh, and KNow.155

According to the ancient systems of knowledge, the process of knowing beings intuitively. This intuitive process is rooted in concepts and ideas constituting what is called religion and philosophy. This explains why the ancient Greeks called the products of their intuition theories (Theo=God), i.e. Divine Laws.

The discussion of knowing brings us back to the split brain analogy posed earlier. Clearly, the intuitive approach

to knowing is more characteristic of the right hemisphere while the more analytical, 'scientific' approach to knowing is characteristic of the left hemisphere.

Within the ancient Egyptian cosmogony, medicine is a natural extension of philosophy and religion. Two of the most important medical papyri, the Ebers papyrus and the Edwin Smith papyrus, include a considerable amount of anatomy, herbal pharmacology, pathology, physical diagnosis (movement of the heart, pulse, diagnostic percussion), chapters on helminthiases, opthalmology, gynecology, contraception, surgical treatment of abscesses and tumors, fractures and burns, alongside of what today is called magic and religion.[156]

Interestingly, Galen (200 AD), who devotedly continued the Hippocratic teachings, and Isocrates, a peer of Hippocrates, attribute the discovery of the art of medicine to the Egyptian priests.[157] Isocrates informs us that Pythagorus introduced philosophy into Greece after study among the Egyptian priests. This instruction included medicine, as among the Ancients philosophy and medicine overlapped. To quote Isocrates in full,

> And the priest, because they enjoyed such conditions of life, discovered for the body the aid which the medical art affords, not that which uses dangerous drugs, but drugs of such a nature that they are as harmless as daily food, yet in their effects are so beneficial that all men agree that the Egyptians are the healthiest and most long of life among men; and then for the soul they introduced philosophy's training, a pursuit which has the power, not only to establish laws but enables one to investigate the nature of the universe.[158]

Out of this context, the Egyptians formulated the concept of the fundamental opposites of nature, adopted by Pythagorus and Hippocrates.[159] Hippocrates expressed this theory as the four bodily humors, which when unbalanced resulted in illness. These four bodily humors correspond to the four fundamental opposites of nature as follows: Fire-Black bile, Earth-Yellow bile, Water-Phlegma, and Air-Blood.

In Health Teachings of the Ageless Wisdom, R. A. Straughn writes,

> Never did they believe as contemporaries claim, that physical matter is composed of fire etc. . . . There is more than necessary evidence to prove that these were mere classification sets.
>
> The structure and function of all life forms and all things affecting them (and all things do) exhibit characteristics classifiable under one of four sets. Biochemistry, Anatomy, Physiology, etc., from the Ancient perspective are not then studies dealing with an awesome array of diverse phenomena, but of only four types.160

According to Straughn, the tetragrammatic classification system was a product of the interaction of the two primal forces, Yin and Yang. He writes,

> As all things and events are effects of the interaction of these two forces, at the 'points' at which they interact, two relatively neutral modes are formed. They both partake of the qualities of the two primary forces differing in that while one 'favors' or tends toward the centripetal (Yin) the other tends toward the centrifugal (Yang) polarity. Because the two primary forces must interact, giving rise to the two

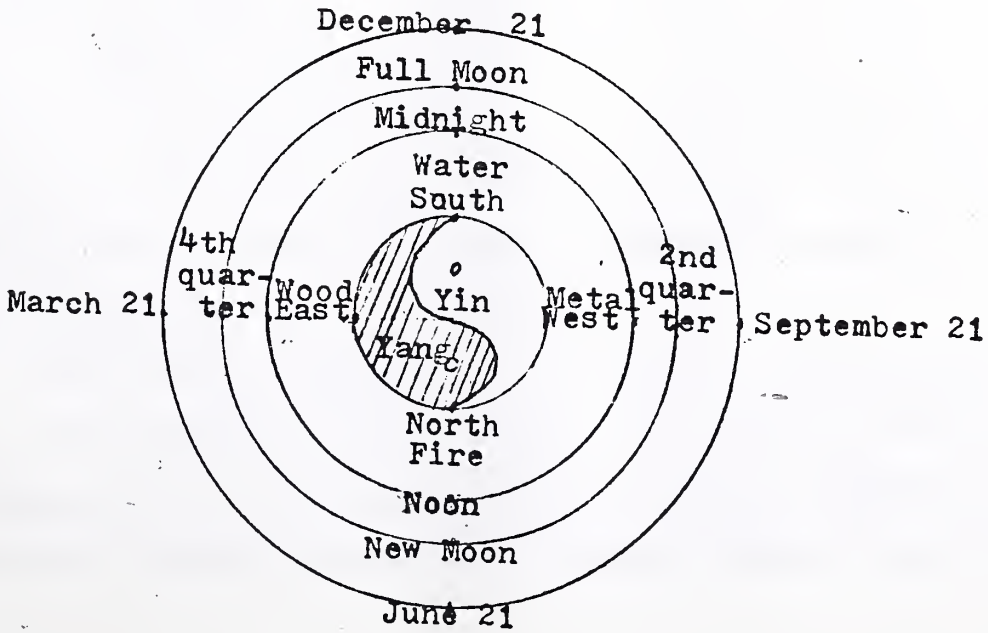
> 'neutral' modes, it is in some instances more practical to adopt a tetragrammatic classification in place of the dual.161

Within the ancient Egyptian cosmogony on a more abstract level, the primordial duality of Yin and Yang expresses itself in the words Nu and Neter (root of the Latin word natura from which we get nature) as well as Soph (root of the word philosophy, signifying energy matter in its undifferentiated state) and Ain (not - that which is without form, i.e. consciousness). This primordial duality is also symbolized by the Egyptian caduceus (also known as the Tree of Life), which is identical to the Western civilization's symbol to the healing arts, Aesclepios.[162]

In fact, the biographer Hurry writes that Aesclepios usurped the position of Imhotep, who lived in the reign of Pharoah Zoster of Egypt, at about 2800 BC.[163] Hurry credits

Imhotep with authorship of the Edwin Smith papyrus.[164] Sir William Osler wrote that he was "the first figure of a physician to stand out clearly in the mists of antiquity."[165]

As the Ancient cosmogonies are functioning from a framework in which things and events are perceived and interpreted as integral parts of a whole, the distinction between these two becomes blurred. They are just points in space-time. Meaning is derived from the understanding that there are four parts to every cycle and that points in one quadrant express similar modes of energy, irregardless of the specific cycle. The following mandala depicts this and its variants are to be seen in many ancient cultures including the Kabalistical and Egyptian traditions.



166

Note that South and North are reversed reflecting the fact that the sun is north of the equator in our summer and south of the equator in the winter. While one could divide the circle in half vertically, as suggested by the T'ai Ch'i Tu symbol in the center, this is actually a tetragrammatic representation of space-time. The dual has given way to four.

If we return to the Bantu classification system alluded to earlier, we see that their categories of reality also reflect the same relativistic way of viewing the world. Kintu, i wrote, is the category of things. It includes the human body, emotions and thoughts. By definition, all Kintu occur in Hantu, space-time. Kuntu are the different modalities expressed through things as a function of that particular point in space-time. This is to say that in the realm of space-time, life is experienced cyclically. We see this in terms of the climate variations during the four seasons and in the functioning of the human body, both on a behavioral level (sleep and wakefulness etc.) and on the chemical level (sympathetic and parasympathetic nervous system expressing opposing functions).

Within Bantu cosmogony, as well as the other cosmogonies i am presenting in this section, the cyclic fluctuation of energy matter at one level could be used to diminish or enhance the cyclic fluctuation at another level. This was

the basis of acupuncture's therapeutic effect (phase energetics) and it was also demonstrated in the discussion of EM fields affecting chemical changes in the body.

If we move east of Africa to the peoples of Ancient Indus Kush (India), we also find four elements. Like the Greeks and Chinese, a fifth element was added to symbolize the influence of Heaven, or, on the one hand, the 'no-thingness' which is the substantial basis of things, and on the other that which is stable and has permanency. For the Greeks it was called Apeiron, in China symbolized by the element metal, and in Indus Kush, Akasha. The Indus Kush equivalent of Yin and Yang is Shakti and Shakta. The concept paralleling Ch'i is embodied in the word Prana.

A very basic application of the tetragrammatic classification system is to the chemical periodic chart. From the Ancient perspective, there are basically four types of elements--metals, non-metals, transition elements that tend to act as non-metals, and transition elements that tend to act as metals. We can say that the more inert elements in the center of the periodic chart correspond to the fifth element of the Ancient cosmological systems.

While Western culture is well versed in the workings 'outer Ch'i,' or the environmental use of EM fields, there is very little study of the workings of inner Ch'i. Within

cultures where vitalistic concepts have developed, there have been technologies devised to control and focus inner Ch'i. In Indian today, one can find a vast array of yoga techniques and systems.

The word yoga actually comes from the Sanskrit root yuj, meaning to bind, attach, yoke, or to direct and concentrate one's attention.[167] On one level, what is being yoked or bound together is the energy field constituting the person, jivatma, to that constituting the 'Universal Spirit,' Paramatma.

Another way to view this is to return to the concept of Yin and Yang. The interaction of these two primal forces is acknowledged by the yogi and he seeks to put himself in Tao, i.e. in harmony with these forces using various techniques, including: asanas - postures to make the body a fit vehicle for more subtler energies; pranayama - rhythmic breath control; bandhas - postures in which certain organs or parts of the body are contracted as the yogi attempts to cleanse the nadis, "tubular channels in the body through which energy flows"[168] (through the use of bandhas and mudras or sealed postures, the positive and negative aspects of Prana are conjoined); and mantras - sounds which have a sympathetic effect on various aspects of the individual's psychical and physical make-up. A more vulgar expression of the latter are the moods and behaviors stimulated by the music we listen to.

As i pointed out earlier, the Sanskrit term for knowing is jnana. Not surprisingly, we also find an aspect of yoga called jnana yoga.

To the yogi, energy and matter are regarded in the same light, regardless of how it manifests, i.e. electricity, the density of matter, thoughts, emotional impulses, etc. Thus, yoga provides a means, a technology by which an individual can harmonize mind, body and spirit, or from the perspective rendered in this appendix, harmonize consciousness and spirit (energy-matter).

In China, conceptions of inner Ch'i gave rise to the art of Tai Ch'i. Through concentration, breath control, relaxed musculature, and slow, smooth body motion, the practitioner learns to recognize the flow of Ch'i in the body. A Tai Ch'i veteran can direct the flow of intrinsic energy anywhere in the body at will. It is this ability that is associated with strength as opposed to say the circumference of one's biceps.

Actually, the list of systems developed for the establishment of inner field equilibrium is as long as the list of these Ancient cosmogonies themselves. However, i cannot really think of a comparative system available to all people in American society. The 'inner Ch'i' of most Americans appears to be more harmonized with the EM force coming through the TV than anything else. I dare think of what

people would do without the latter. Moreover, the rising incidence of alcoholism, drug addiction, and mental illness, in many respects, reflects the fact that there is no technology in American society designed to help individuals gain inner equilibrium. The martial arts come closest to this but for the most part the public has been caught up into a very physical, competitive expression of these arts. In reality, this too comes from the East.

What has struck my person is that the philosophy behind 20th Century physics, while confined to physics and parapsychological fields in the West and embodied by the Yogis and spiritual aspirants of the East, is an integral part of the daily life of those African people, still practicing their traditional religion. Let us turn our full attention to the latter.

Among the Bantu in West Africa, we find the cosmogony of the Dogon people. In 1948, Marcel Griaule published his conversations with an elder of the Dogon community, Ogotemmeli, concerning that peoples' cosmogony. Ogotemmeli related to Griaule that the one God, Amma, had intercourse with Earth, resulting in the birth of homogenous products of God, the twin Nummo spirits, carriers of the 'Word.'[169] Relative to each other, they expressed polar aspects of the Creation. This is actually another way of saying Yin and Yang and that what is being carried (the 'Word') is Ch'i.

The Dogon say that the first act in the ordering of the Universe was the creation of helicoid spirals. It is written that the Nummo spirits, looking down from heaven, seeing their mother, the Earth, naked and speechless, came down to Earth bringing with them fibers pulled from plants already created in the heavenly regions.[170] (Note that the ordering of metaphysical reality precedes the physical. By Earth is meant the phenomenal or physical realm.) The helicoid spirals made from the essence of Nummo,

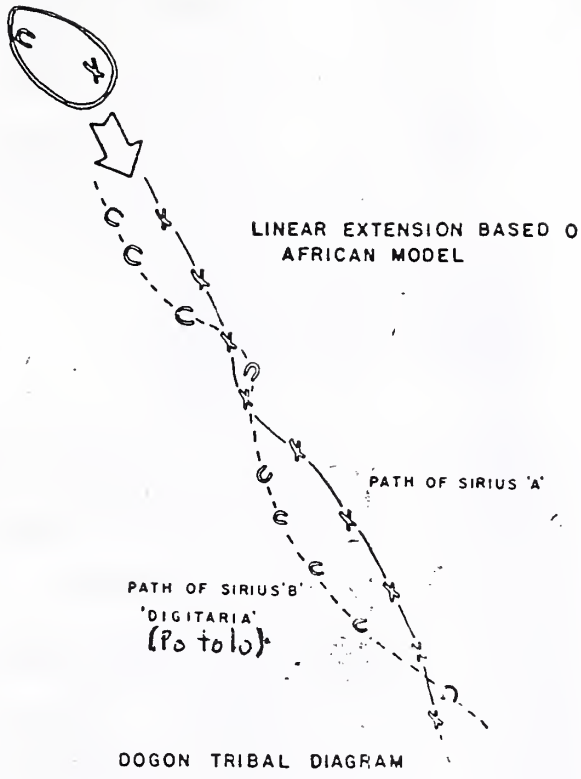
> . . . were Nummo in motion, as shown in the undulating line which can be prolonged to infinity. When Nummo speaks what comes from its mouth is a warm vapor which conveys and itself constitutes speech (the power to initiate something). This vapor, like all waters, has sound, dies away in a helicoid line.171

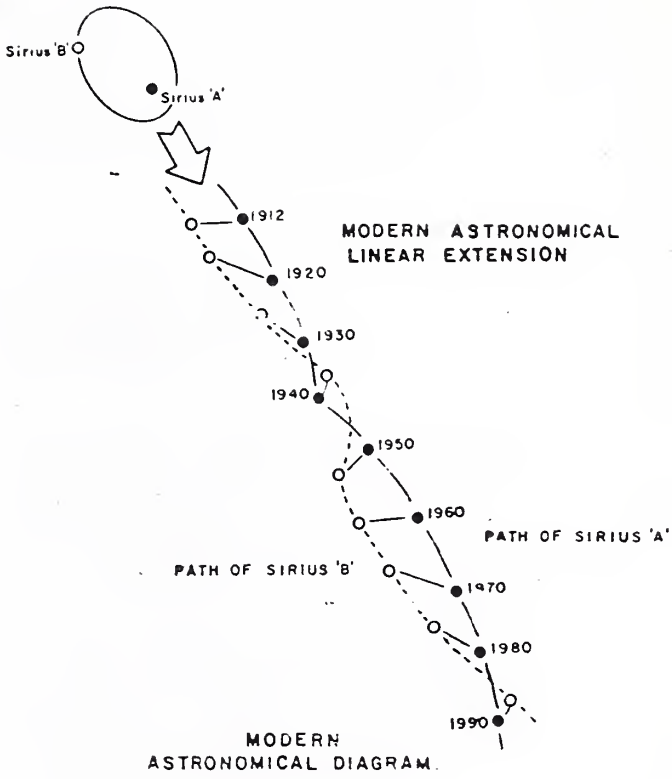
(through water germination occurs and its substance is utilized as that which germinates takes form. However, the intrinsic helicoid pattern is maintained). The Dogon go on to say that, "The spiral of the Word gave to the womb its regenerative movement"[172] (womb of Earth, i.e. the power of the physical world to sustain life). Thus, it is through plaited coils that the Word was revealed on Earth. These plaited coils were the Earth's first set of clothes.

Clearly, this is a right-sided (hemisphere) conception of the creative process. However, there is an inherent logic to what is being said, comprehensible to those that have the symbolic keys. It was said that helicoid pattern or plaited

coils were the source of the regenerative movement through which God expresses itself on Earth. If one were to reread this excerpt visualizing this process, one cannot help but think of the double helix of DNA. In this African cosmogony, the emphasis is on recognizing this Yin-Yang type, cyclic image, as an archetypal pattern, to be seen in all organic processes and to be used in everyday life, in man's efforts to harmonize with the Whole. In the West, the approach has been to dissect and analyze the DNA itself with an aim toward manipulation and control of this process.

Of note is that since the 1940's the Western world has taken a deep interest in Dogon cosmogony. In the book The Sirius Mystery, Robert Temples, a professional astronomer, discloses that the Dogon have had considerable knowledge of astronomy for over two thousand years. What is more, they were aware of the fact that the star, Sirius, has an invisible companion, Sirius B, called Potolo by the Dogon. Sirius B's existence was not suspected by Western astronomers until this century, and it was photographed successfully only in 1970.[172] Not only did the Dogons know of its existence but they knew that it was one of the heaviest stars in the galaxy and that is periodicity is every 50 years. Indeed, every 50 years the Dogon celebrate the renewal of Potolo's cycle with an elaborate ritual.





> The linear extension on the right is scientifically reliable, based on measurements of the rate of revolution of Sirius B around Sirius A. The extension on the left is not scientifically reliable. It is presumed correlation, for there is no way in which the rate of revolution of Digitaria can be known certainly from the Dogon information.173

By what means do the Dogon have the power to know such things? Their physical technology has been described as stone age yet this does not appear to have denied them the force to know. For the Dogon as with all Bantu people, the physical plane, earth, is only a symbolic representation of a

larger reality. The Dogon himself is Muntu (Bantu is the plural of Muntu . . . "God is a great Muntu"),[174] the formless, imperceptible will and consciousness, that spans the entire Creation. Father Placcide Temples writes in the book, Bantu Philosophy,

> The Bantu feels and knows himself to be a vital force in an intimate personal relationship with other forces acting above him and below him in the hierarchy of forces.175

The concept of separate beings of substance which find themselves side by side yet entirely independent of one another is foreign to Bantu thought. He knows himself to be a vital force ever being influenced by forces and ever influencing others. In Bantu cosmogony, the world of forces is held like a spider's web of which no single thread can be caused to vibrate without shaking the whole network.

Among the Bantu to know what particular vital influence has attacked a man, to cause his sickness, one consults a specialist in the science of the interference of forces. However, direct knowledge of the living force within one's being is not accessible to everyone. It is only the privilege of 'seers,' the ones with the force to know.

The Bantu have no problem with the idea that the vital force can be concentrated at a point in the body or that it may be exteriorized to bring about a particular effect. In fact, among the Bantu of Southern Africa, William Ten Rhyne,

a 17th Century physician for the Dutch East India Company, recorded the use of acupuncture and scarification for the treatment of gout.[176]

On another level, the idea of exteriorization of vital force expresses itself in the concept that man can directly reinforce or diminish the being of another man,

> A living man's words or his gestures are considered, more than any other manifestation, to be the formal expression or sign of his vital influence. From that, if words or gestures lead to favorable or unfavorable effects as they are applied to a predetermined person, one may deduce therefore that such a person exercise his vital influences, for good or ill, upon such other persons.177

In a recent Mayo Clinic issue, Pruitt has demonstrated that such an influence can indeed cause death.[178] In the West, the vital influence concept is expressed in the placebo effect.

While the majority of us will accept the notion of vital influence, as we experience it in our everyday lives, we will question the degree that such an influence can have and further that people whose physical technology is inferior to that of the Western world's could harness such energy. By what means it is asked. A reply--By the same means that Western technology has developed in the direction that it has, willful direction resulting from a particular perception and interpretation of reality.

Peoples of the world, separated in time and space have looked for the answers to life's questions and problems in different aspects of the world. For many, 'the field' has been the backdrop from which their answers have arisen. They have focused their energies and genius within. Where metaphysical realities have been denied, materialism has been the major shaping force in the culture. On the other hand, where the true perception of subtler realities has been lost, superstition has been the dominant force. Without the power to know, there can be no balance, no evolution.

Though i have not explicitly said it, the master key is culture. Culture or a peoples' way of life will provide the framework through which their creative energy will express itself. That which is cultivated in a people will manifest itself in terms of how they conceive of and interpret reality. Whatever that people gives attention to becomes reality. From the standpoint of field physics, that which is reflects only one Uni-versal order; therefore, there are only questions as the answers already exist. Indeed, many non-Western cultures have lived the answers to the questions that have yet to be seriously posed by the Western world.

Where a culture is not allowed to do what it wills, not only does that people suffer but so does the rest of

humanity. Another key in the organic evolution of mankind becomes warped, perhaps only to return to the mold for which it was intended after those cultures remaining either make a conscious, wholehearted effort to establish a more equilibrated existence or stagnate and extinguish themselves in their own deficiencies.

The mainstream of Western civilization continues to miscomprehend the cultures of many non-Western peoples, and thus the peoples themselves. Little value is seen in their orientation toward life. Indeed, the artifacts of their lands have made quaint museum pieces as the people and their way of life have yielded to 'progress.' The Western world, blinded by its own accomplishments and orientation toward life, have branded such cultures as primitive and made them into limitations of its own. Products of these 'primitive' cultures, including acupuncture, have been at the least, viewed as anachronisms, areas to be investigated by anthropologists.

As we approach the 21st Century and the signs of decay in the Western world become too malignant to be ignored, perhaps then it will be realized that the present road to progress is in need of some major repairs. Maybe then society will take stock itself in the light of those who have traveled a different road.

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